LOAN DOCUMENT

PHOTOGRAPH THIS SHEET

DTIC ACCESSION NUMBER

LEVEL

INVENTORY 0

Indicators of Indiscipline

DOCUMENT IDENTIFICATION

31 AUG 91

DISTRIBUTION STATEMENT A
Approved for Public Release
Distribution Unlimited

DISTRIBUTION STATEMENT

HANDLE WITH CARE

ACCESSION FOR

NTIS GRA&I ☒
DTIC TRAC ☐
UNANNOUNCED ☐
JUSTIFICATION

BY

DISTRIBUTION/

AVAILABILITY CODES

DISTRIBUTION	AVAILABILITY AND/OR SPECIAL	
A-1		

DISTRIBUTION STAMP

DATE ACCESSIONED

DATE RETURNED

20000203 114

DATE RECEIVED IN DTIC

REGISTERED OR CERTIFIED NUMBER

PHOTOGRAPH THIS SHEET AND RETURN TO DTIC-FDAC

DTIC FORM 70A JUN 90

DOCUMENT PROCESSING SHEET

PREVIOUS EDITIONS MAY BE USED UNTIL STOCK IS EXHAUSTED.

LOAN DOCUMENT

DTIC QUALITY INSPECTED 4

INDICATORS OF INDISCIPLINE
PHASE 2

S.D. Owens
J.D. Robertson
D.C. Thill
J.L. Zeller, Jr.

August 31, 1991

Contract No. DAAJ09-88-D-A002

Prepared for:

U.S. Army Safety Center
Fort Rucker, Alabama

COBRO Corporation
Daleville, Alabama 36322

FOR FURTHER INFORMATION CONCERNING DISTRIBUTION CALL (703) 767-8040

PLEASE CHECK THE APPROPRIATE BLOCK BELOW:

AQ# _____

☐ _____ copies are being forwarded. Indicate whether Statement A. B. C. D. E, F. or X applies.

☑ DISTRIBUTION STATEMENT A:
APPROVED FOR PUBLIC RELEASE: DISTRIBUTION IS UNLIMITED

☐ DISTRIBUTION STATEMENT B:
DISTRIBUTION AUTHORIZED TO U.S. GOVERNMENT AGENCIES ONLY; (Indicate Reason and Date). OTHER REQUESTS FOR THIS DOCUMENT SHALL BE REFERRED TO (Indicate Controlling DoD Office).

☐ DISTRIBUTION STATEMENT C:
DISTRIBUTION AUTHORIZED TO U.S. GOVERNMENT AGENCIES AND THEIR CONTRACTORS; (Indicate Reason and Date). OTHER REQUESTS FOR THIS DOCUMENT SHALL BE REFERRED TO (Indicate Controlling DoD Office).

☐ DISTRIBUTION STATEMENT D:
DISTRIBUTION AUTHORIZED TO DoD AND U.S. DoD CONTRACTORS ONLY; (Indicate Reason and Date). OTHER REQUESTS SHALL BE REFERRED TO (Indicate Controlling DoD Office).

☐ DISTRIBUTION STATEMENT E:
DISTRIBUTION AUTHORIZED TO DoD COMPONENTS ONLY; (Indicate Reason and Date). OTHER REQUESTS SHALL BE REFERRED TO (Indicate Controlling DoD Office).

☐ DISTRIBUTION STATEMENT F:
FURTHER DISSEMINATION ONLY AS DIRECTED BY (Indicate Controlling DoD Office and Date) or HIGHER DoD AUTHORITY.

☐ DISTRIBUTION STATEMENT X:
DISTRIBUTION AUTHORIZED TO U.S GOVERNMENT AGENCIES AND PRIVATE INDIVIDUALS OR ENTERPRISES ELIGIBLE TO OBTAIN EXPORT-CONTROLLED TECHNICAL DATA IN ACCORDANCE WITH DoD DIRECTIVE 5230.25, WITHHOLDING OF UNCLASSIFIED TECHNICAL DATA FROM PUBLIC DISCLOSURE, 6 Nov 1984 (indicate date of determination). CONTROLLING DoD OFFICE IS (Indicate Controlling DoD Office).

☐ This document was previously forwarded to DTIC on _____ (date) and the AD number is _____

☐ In accordance with provisions of DoD instructions, the document requested is not supplied because:

☐ It will be published at a later date. (Enter approximate date, if known).

☐ Other. (Give Reason)

DoD Directive 5230.24, "Distribution Statements on Technical Documents," 18 Mar 87, contains seven distribution statements, as described briefly above. Technical Documents must be assigned distribution statements.

Cynthia Gleisberg
Print or Type Name

334-255-7924
Telephone Number

Cynthia Gleisberg
Authorized Signature/Date

EXECUTIVE SUMMARY

Requirement:

Phase 1 of the indicators of indiscipline study, (reference 1), consisted of a literature review of journal articles and technical reports dealing with human-error accidents, a review of motivational factors which may influence inadequate self-discipline, and the cross-referencing of Army recruitment file data with certain findings from the literature review. As a result of this research, a list of 20 indicators was identified which might be predictive of undisciplined behavior in soldiers.

Phase 2 research was conducted to determine which of the indicators identified by the phase 1 study could successfully identify soldiers who cause accidents due to indiscipline and to field test a motivational management system to determine its ability to increase self-discipline and performance to standards.

Procedures:

A search was conducted to identify computerized data bases which contained information on soldiers that related to one of the 20 indicators of indiscipline identified in phase 1. After the specific data elements that were needed from each of these data bases were determined, coordination to obtain the data was effected with each of the owning organizations. Once the data were received from the various sources, the variables from the different data bases were collected to form two data bases -- a non-aviation accident data set and an aviation accident data set. Specific procedures pertaining to the order in which the variables would be entered, the identification of dichotomous variables, and the order in which the data bases would be entered were developed to obtain accident and non-accident groups of individuals for both the non-aviation and aviation data sets.

Descriptive statistical procedures were conducted to obtain an overall look at the data distributions of the categorical and continuous variables. Certain variables within the data bases were manipulated to create new variables, and an inferential statistical procedure was conducted to establish which variables would best predict which personnel, in either data set, would most likely be involved in accidents.

A systematic review of 484 Class A-C Army aviation accidents attributed to human error was conducted by subject matter experts to: identify human errors due wholly or partly to indiscipline; match these errors to a preliminary list of high-risk behaviors provided by the U.S. Army Safety Center (USASC); refine the description of the preliminary list of high-risk behaviors to more accurately describe the behavior existing in the accident report; and compile a final, prioritized list of the most frequently occurring high-risk behaviors for subsequent field testing.

A review of Army Regulations (ARs) was conducted to determine the administrative actions presently available to commanders to preclude high-risk behavior. A questionnaire was developed to survey Army aviators about their personal experiences with high-risk behavior, using the prioritized list of high-risk behaviors developed from the systematic review of accident cases. Two candidate risk management techniques were developed for implementation in aviation units. A brief survey was conducted to assess the willingness of aviation unit commanders and Army aviators to implement or support the two techniques within their units.

Findings:

Ten agencies controlling 12 data bases which could support the study were identified. Data were received from eight data bases owned or controlled by six different organizations. The data bases contained information on individuals relevant to 11 of the 20 indicators of indiscipline identified by phase 1. Initial frequency distributions for the aviation accident data set indicated that many of the data fields were poorly managed, which made matching among the data bases and construction of the data sets nearly impossible. Additionally, the number of matches between these data bases and the at-fault accident personnel was too low to allow appropriate analyses. As a result, the analysis of aviation accidents was abandoned.

The initial frequency distributions for the non-aviation data set showed that the officer and National Guard/Reserve tapes contained no valid entries. This problem restricted the analysis to enlisted personnel only. Approximately 11,000 matches between enlisted personnel in the data set and the accident data base were identified. Correlations among the variables were run, and although well over half of the variables correlated significantly (none higher than 0.10), the individual variables explained so little of the outcome (i.e., whether a person would be involved in an accident), that they were unusable. Because of the low correlations between predictors and accident involvement and because data limitations did not permit multivariate analyses, a discriminant analysis was not performed.

Review of the human-error accidents revealed that high-risk behavior was involved in over 20 percent of the accident cases in the data sample, with approximately half of those involving flagrant violations of regulations or procedures. The most commonly occurring type of high-risk behavior involved unauthorized aerobatics, return-to-target maneuvers, or "buzzing" ground vehicles. Results of the questionnaire to determine the high-risk behavior baseline for unit aviators indicated that the most frequently occurring high-risk behavior was associated with improper performance planning, exceeding crew endurance, or improperly documenting hazard maps. According to the accident data, improper performance planning was the only high-risk behavior in the top five.

Accidents resulting from high-risk behavior are a significant problem in Army aviation. Previous attempts to reduce this problem through increased emphasis on personal accountability and the use of negative enforcement programs have been largely unsuccessful. Information pertaining to the specific types of high-risk behavior, the severity of

accidents resulting from this behavior, and methods to alleviate the problems have not been readily available to the aviation community. Two high risk behavior management techniques were developed for implementation within aviation units -- education and reinforcement/enforcement.

Utilization:

Recommended changes are proposed to improve the accident investigation process by modifying the data collection effort to include specific inquiries and appropriate background information on all individuals involved in Army accidents. This would provide the necessary information on accident and non-accident groups pertaining to all 20 indicators of indiscipline. Furthermore, the 3W taxonomy used by accident investigators should be modified to delete "inadequate attention" as a system cause for human error.

Recommendations are also proposed to institute the education and reinforcement/enforcement techniques for combating high-risk behavior committed by air crewmembers. Additionally, if further data are needed to establish a baseline for high-risk behavior in Army aviation, the refined survey (appendix I) should be administered to a larger sample of Army aviation personnel.

INTENTIONALLY LEFT BLANK

CONTENTS

LIST OF APPENDICES

Page No.

LIST OF TABLES

Page No.

INTRODUCTION

USASC statistics have shown that, since 1980, human error has been a causal factor in approximately 80 percent of Army accidents. The largest single category of human error accidents is comprised of those due to indiscipline. Indiscipline, as defined by the USASC, refers to errors caused by inadequate composure, inattention, overconfidence or lack of confidence, improper attitude or motivation, self- induced fatigue, and alcohol or drug abuse. A two-phase study was undertaken to identify indicators of indiscipline and to determine how these indicators might be used to improve Army safety.

Phase 1 of the indicators of indiscipline study, completed in 1991, consisted of a literature review of journal articles and technical reports dealing with human-error accidents, a review of motivational factors which might influence inadequate self-discipline, and the cross-referencing of Army recruitment file data with certain findings from the literature review. As a result of this research, the phase 1 contractor identified a list of 20 indicators which might be predictive of undisciplined behavior in soldiers. These 20 indicators were related to demographic information, information that indicated involvement in some sort of civil offense or violation, and information pertaining to the social development of the individual.

This phase of the study was designed to accomplish two objectives -- to determine which of the indicators from phase 1 could successfully identify soldiers who cause accidents due to indiscipline and to test a motivational management system to determine its effectiveness in increasing self-discipline and performance to standards. These objectives are addressed separately in this report.

PREDICTING INDISCIPLINE

Data Base Search - Method

Results of phase 1, including the 20 indicators of indiscipline (table 1) identified by the phase 1 contractor, were reviewed to gain an understanding of each indicator and the supporting research. A search was conducted to identify computerized data bases which contained information on soldiers relating to any of the 20 indicators of indiscipline identified in phase 1.

The phase 1 report revealed six general categories and 20 specific sub-categories, titled the "Indicators of Indiscipline." The complete matrix which combines the recruitment file factors related to accidents and their associated studies is located in appendix A. Table 1 depicts the 20 indicators of indiscipline that deemed worthy of further research by phase 1:

Table 1

Indicators of Indiscipline from Phase 1

A. Driving Behavior 1. Previous Traffic Violations 2. Previous Accident History 3. Driving Experience 4. Type of Driver Training	D. Social/Intellectual Achievement 10. Early Socialization/Parental Relations 11. IQ and Aptitude 12. Socioeconomic Status 13. Education Level
B. Military Service 5. Military Rank 6. Years of Military Service	E. Demographics 14. Age 15. Age at Enlistment 16. Job Type and Level 17. Marital Status
C. Drug/Alcohol/Disciplinary/Crime Involvement 7. DUI, Alcohol, Drug Involvement 8. Non-traffic Disciplinary Offenses 9. Criminal Offenses	F. Life Events, Peers, Work History 18. History of Life Events and Changes 19. Negative Peer Relations 20. Uneven Work Record

Three basic requirements were used to select potential data bases for the research. First, the data base needed to contain information on individuals relating to one or more of the 20 indicators of indiscipline. Second, the data base had to contain at least one personal identifier data field in common with the other data bases being used (e.g., name, social security account number (SSAN)), allowing researchers to retrieve selected data from various data bases to create a record for each individual included in the study. And third, the data base had to be accessible at little or no cost.

The preliminary data search began with the Dialog Information Retrieval System, file number 230, Computer-Readable Data Bases. This file contains detailed descriptions of

approximately 4,200 publicly available data bases accessible through an on-line vendor or batch processor or available for direct lease, license, or purchase on CD-ROM, diskette, magnetic tape, or other recording or storage medium. Because of the public access, data bases listed in Dialog did not contain personal individual information such as SSAN necessary to support the study. In fact, no data base with public access proved useful.

Efforts then focused on the U.S. Army Recruiting Command and local law enforcement agencies and eventually expanded to include several other Federal agencies. Further data base searches concentrated primarily on Federal, State, and local government agencies and other agencies within the Department of Defense (DOD) and the Department of the Army (DA). It was necessary to determine the particular information in the data bases, the process of obtaining access to the data, and the specific data elements that were needed from each of these data bases. Finally, with USASC assistance, coordination was effected to obtain the desired data from each of the owning organizations. All requests for data to these agencies described the research for which the data would be used, specified a format was compatible with USASC computer hardware, requested a record layout of the data, and requested data from a 5-year period from January 1985 through the most current data available (unless otherwise specified).

Data Base Search - Results

Ten agencies controlling 12 data bases which contained data sufficient to support the study were identified. A summary of each data base and its availablity/accessibility follows:

Defense Manpower Data Center (DMDC)

The Active Duty Military Master and Loss Edit data base from the DMDC contains records for all military personnel who are, or were, on active duty for 180 days or more. Files in the data base are created by the U.S. Army Recruiting Command during the service-member's (SMs) accession into the Army. Each individual data file is periodically updated for as long as the SM remains on active duty. A similar file, albeit with slightly different fields and update procedures unique to their status, is maintained on Reserve Component and National Guard personnel. A 10-year period of time, October 1979 through the most current 1990 data, was selected.

The following fields of information were selected from the Active Duty Military Master and Loss Edit data base. (The fields provide either identification data used to match personnel data found in other data bases or actual information on the SM relating to one or more of the 20 indicators of indiscipline.)

1. SSAN
2. Total Active Federal Service
3. Education Level
4. Armed Forces Qualification Test (AFQT) Percentile Score at Entry
5. Pay Grade
6. Date of Birth
7. Race
8. Educational Designator
9. Marital Status
10. Highest Year of Education Completed
11. Ethnic Group
12. Mental Category at Entry
13. Primary Military Occupational Specialty (MOS)
14. Date of Separation/Accession
15. Basic Active Service Date
16. Expiration, Termination of Service (ETS) Date
17. Service Component
18. Years of Active Duty Service
19. Character of Service (Enlisted)
20. Character of Service (Officer)

Subsequent to receiving the above information, another request was sent to DMDC to obtain Armed Services Vocational Aptitude Battery (ASVAB) scores for all records.

National Highway Traffic Safety Administration (NHTSA)

The National Highway Traffic Safety Administration (NHTSA) maintains the National Driver Register (NDR), a central computer file of information on individuals whose license(s) to operate a motor vehicle has been revoked, suspended, cancelled, or denied. This data base contains information on the indicators of previous traffic violations, and possible previous accident history and DUI involvement. The NDR contains adequate personal data for matching, (such as name, date of birth, sex, height, weight, etc.,) as well as the date and nature of the violation which led to the license suspension or revocation. The NDR receives its input primarily from state law enforcement agencies. Its primary purpose is to assist these officials in locating information about problem drivers when the driver applies for an operator's license.

The NHTSA did not release their data because Public Law 97-364 only authorizes release of NDR data only under specific circumstances. The law allows data to be released to state or federal licensing officials in connection with driver license applications or through state driver licensing officials to companies seeking information on an individual employed or seeking employment as a driver of a motor vehicle or as a railroad locomotive operator. Data can also be released to the Federal Aviation Administration (FAA) for an individual who has received or applied for an Airman's Certificate or to the National Transportation Safety Board (NTSB) or the Office of Motor Carriers in conjunction with an accident investigation. Finally, information is releasable to an individual desiring to determine if the file contains data on him or her.

Without access to NDR data, several other alternatives with the potential to provide information on traffic violations and accident history were explored. Realizing that the NDR was furnished its information from individual states, Dr. Donald W. Segraves, Executive Director of the All Industry Research Advisory Council (AIRAC), Chicago, Illinois, was contacted to ascertain if it would be practical, or possible, to obtain such information from individual states. AIRAC has done extensive research for the automobile insurance industry concerning the reliability of data on individual driving records received from individual states. No centralized clearing house for this information exists, save the "gross violator" data base (NDR) maintained by the NHTSA. Some of the problems with the available data are:

1. Availability. Over 20 states have passed legislation removing this information from the public record and restricting access to it, even by insurance companies. The number of states restricting the data is growing daily.

2. Reliability. The states are not standardized in the methodology used to record traffic violations and accidents. AIRAC estimates that, on a national level, only 18 percent to 20 percent of violations and accidents are recorded in the state data bases.

3. Expense. Insurance companies are charged between $3 and $10 for each individual motor vehicle record requested.

Dr. Segraves could not estimate the cost the states would charge for sharing the entire data base, but speculated that it would be quite expensive, particularly in view of the "hit and miss" nature of the expected return.

Because of these reasons, no requests for data were made to individual states.

United States (U.S.) Courts

Records of traffic violations occurring on U.S. Government installations are maintained by the Central Violations Bureau (CVB) of the Administrative Office, U.S. Courts. This data base contains information on individuals for the indicators of previous traffic violations, previous accident history, and DUI involvement. A sample copy of the data maintained by the CVB revealed that their information was very limited in scope, providing only name, address, date and type of violation, amount of fine, vehicle make and license number, and how the fine was paid. Information needed for matching individuals in this record to other records was very limited. SSANs typically are not a part of the CVB's data record. The two fields maintained by the CVB that were of use to the study were violator's name and offense, if SSANs could be obtained with the records. Requests for these two fields from records that had SSANs were made; however, even after numerous written and telephonic followups, no data had been received by the end of the contract period.

Federal Bureau of Investigation (FBI) and State/Local Law Enforcement Agencies

The U.S. Department of Justice, FBI, National Crime Information Center (NCIC) was contacted in order to obtain data relevant to the indicators of Non-traffic offenses and criminal offenses. Because the NCIC is the national clearing house for data on wanted or missing persons, stolen property, and other law enforcement data, it was considered the optimum source for the data to support the study. However, NCIC data are restricted to criminal justice and criminal justice employment purposes. Therefore, these data could not be obtained. State and local law enforcement agencies who control data were similarly restricted or the data were too localized in nature to be useful, and therefore, was not requested.

U.S. Army Criminal Investigation Command (USACIDC)

The USACIDC maintains in their Crime Records Center (CRC) a data base of their investigations and other military police criminal investigations. The CRC data base is indexed by name and other personal identifiers such as SSAN and date of birth. The data base includes records of traffic accidents, alcohol-and/or drug-related involvement, and other criminal activity. This data base could support the indicators of previous accident history, non-traffic offenses and criminal offenses. However, the CRC data base contains information about all persons involved in an investigation, (perpetrators as well as victims and witnesses) with no method of discrimination. Because of this, the CRC data base was unusable and, therefore, not requested.

U.S. Army Drug and Alcohol Operations Agency (USADAOA)

The USADAOA maintains a data base called the Drug and Alcohol Management Information System (DAMIS) that is capable of supporting the indicator of indiscipline DUI/alcohol/drug involvement. DAMIS is the Army's repository for all Alcohol and Drug Abuse Prevention and Control Program (ADAPCP) referrals. Data within DAMIS are available for research purposes if the agency performing the research complies with Public Health Service, 42 Code of Federal Regulations, chapter 1, subpart D, paragraph 2.16 and paragraph 2.52, pertaining to protection of individual identities.

DAMIS is provided input by ADAPCP counseling centers Army wide using the Client Oriented Drug and Alcohol Reporting System (CODARS). The source document which provides DAMIS with individual information is DA Form 4465, October 85, ADAPCP Client Intake/Screening Record. From this form, the fields SSAN, service component, pay grade, date of birth, education level, and MOS were selected as matching criteria. Because each record in DAMIS indicates DUI/alcohol/drug involvment, any personnel match would be positive. These data were requested and received from the USADAOA.

AVIATION-RELATED DATA BASES

During the search, aviation-related data bases belonging to the FAA, the NTSB, and the Army Research Institute (ARI) were located. Although phase 1 identified no indicator that applied specifically to aviation-related behavior or aviation accidents, a 21st indicator, entitled "Previous Aviation Accidents/Violations," was added to the list of indicators because of the availability of data in the NTSB and FAA data bases pertaining to aviation accidents and violations. Additionally, the ARI data base provided information on an individual's aptitude to learn pilot skills.

NTSB

The NTSB maintains a data base of civil aviation accident data which contains information pertaining to the indicator previous aviation accidents/violations. The source document for this data is NTSB Form 6120.4, entitled "Factual Report, Aviation Accident/Incident." Information on this form is generated by NTSB accident investigators and is subsequently used to input data into their data base. The fields selected from this form to provide matching data were name, pilot certificate number, date of birth, age, sex, and principal profession. Three other fields were selected to discriminate between accident or incident involvement. Coordination was conducted to ensure that data were received only on individuals who had at-fault involvement in the accidents/incidents. The data were received and integrated into the study data base.

FAA

The FAA maintains three data bases on civil aviation accidents and violations. The Pilot Deviation System (PDS) is maintained in dBase III format in the FAA's Office of Safety Analysis, National Aviation Safety Data Center, Washington, D.C. The Enforcement Information System (EIS) and the Accident/Incident Data System (AIDS) are maintained by the FAA's Aviation Standard's Operational Systems Branch, Oklahoma City, Oklahoma. The PDS data base contains information on reported deviations which occurred in U.S.-controlled airspace. PDS information is gathered from FAA Form 8020.11 (Preliminary notice) and the FAA Form 8020.5 (Final report). The data covers July 1985 to present and contains approximately 2,500 to 3,000 records for each year. The following PDS fields were selected for matching purposes: pilot name, copilot name, Airman's Certificate number (both pilot and copilot), and date of birth, (both pilot and copilot). Four other fields were selected to discern the nature and the seriousness of the violation committed.

The EIS contains information on all FAA enforcement cases and receives its input from completed FAA Form 2150-2 (Violation Report Data -- Certificate Action, Reprimands, Referrals), FAA Form 2150-3 (Violation Report Data -- Civil Penalties, Criminal, Miscellaneous), FAA Form 2150-4 (Violation Report Data -- Hazardous Materials), and FAA Form 2150-5 (Enforcement Investigative Report). This data base contains data for the most recent 5-years plus the current year, with 15,000 to 17,000 records for each year. The

following EIS fields were selected for matching purposes: violator's name, date of birth, and airman's certificate number. Four other fields were selected to discern the nature and the seriousness of the violation committed.

The AIDS contains information on all general aviation accidents/incidents, air carrier incidents, and some air carrier accidents. AIDS information is gathered from NTSB Forms 6120.19, 6120.1, and 6120.4 (accident reports); NTSB accident data tapes; FAA Form 8020.5 (incident reports); and teletype preliminary data. This data base also contains data for the most recent 5-years, plus the current year, with 7,000 to 8,000 records for each year. The following AIDS fields were selected for matching purposes: Airman's Certificate number, age, and profession. Two other fields were selected to discern the nature of the accident, and additional coordination was effected to ensure that data were received only on individuals who had at-fault involvement in the accidents/incidents.

The FAA and NTSB data were obtained. However, as the information was integrated into the data base, a potential matching problem was encountered. The FAA utilizes Airman's Certificate numbers rather than SSANs as the primary means of individual identification. Airman Certificates issued since 1980 are the same as an individual's SSAN. Older certificates are typically a 5- to7-digit number. Certificate numbers are entered as a 9-digit field, using lead zeros for those SSANs for individuals who were issued Airman Certificates prior to 1980. According to the Social Security Administration, SSANs beginning with two zeros were issued to individuals in the Northeast United States. Additional matching of name, date of birth, age, and profession was necessary for any matches of SSANs beginning with two zeros.

ARI

A source of data that provided a measure of an individual's aptitude for learning pilot skills and supports the indicator IQ and aptitude is the Flight Aptitude Selection Test (FAST). This battery of tests is administered by the Army to potential flight training candidates. Score results from both the Alternate FAST (AFAST) and the Revised FAST (RFAST) batteries were obtained from the ARI, Aviation Research and Development Activity, Fort Rucker, Alabama. FAST battery scores, indexed by SSAN for matching purposes, were integrated into the study Statistical Analysis System (SAS) data base.

USASC

The Army Safety Management Information System (ASMIS), the Army's accident data base maintained by the USASC, is the final data base used in this research. ASMIS receives its input from the various accident report forms used by the Army to report ground and aviation accidents. Aviation and ground accident data were selected on Army personnel who were involved in at-fault, human error accidents.

Summary of Data Obtained

Data were received from eight data bases owned or controlled by six different organizations. The data bases contained information on individuals relevant to 11 of the indicators of indiscipline. These indicators and the data source are shown in table 2. Accessible computerized data bases were not found to support the following indicators:

1. Driving Experience
2. Type of Driver Training
3. Previous Traffic Violations
4. Non-traffic Offenses
5. Criminal Offenses
6. Early Social/Parental Relations
7. Socioeconomic Status
8. History of Life Events
9. Negative Peer Relations
10. Uneven Work Record

Table 2

Data Base/Indicator Matrix

	DATA BASE OWNER/CONTROLLER					
INDICATOR OF INDISCIPLINE	DMDC	USASC	USADAOA	NTSB	FAA	ARI
Previous Driving Accident History		X				
Military Rank	X	X				
Years Military Service	X					
DUI/Alcohol/Drugs			X			
IQ & Aptitude	X					X
Education Level	X		X			
Age	X	X	X	X	X	
Age at Enlistment	X					
Job Type and Level	X	X				
Marital Status	X					
Prev. Avn. Acc/Violations				X	X	

Data Base Analysis - Method

The objective was to analyze a number of variables (especially those related to indiscipline) to determine which variables might predict accident involvement. Research was focused on both aviation and ground accidents for both officer and enlisted personnel.

A SAS data set was constructed from the desired data bases, and statistical procedures considered the most appropriate were developed. Also, the variables desired for the analysis and the accident years which would be covered (1985 to 1990) were selected. The data fields selected for analysis for both the ground accident data set and the aviation accident data set are contained in appendix B.

The SAS data set was constructed with the assistance of the USASC. Additionally, USASC contacted the "owners" of the various data bases and obtained the particular data fields that were needed for the analysis. Unfortunately, significant problems were encountered with these data bases. However, certain SAS procedures were conducted, and decisions regarding the analyses and their conclusions were made.

Aviation Accidents. The original plan for the aviation accident analysis called for the integration of a number of data bases with the DMDC master data base. The desired data bases included: FAA/DEV, FAA/EIS, FAA/AID, NTSB, CODARS, AFAST, RFAST, and ASMIS. Once the SAS data set was built, a PROC FREQ (frequency procedure) was run to determine the size and shape of the data distribution. Initial frequency distributions indicated that many of the data fields were poorly managed (e.g., name fields that did not consistently maintain last name first and first name last across the years sampled). This made matching among the data bases (necessary to build the SAS data set) nearly impossible. Also, in the case of the NTSB and FAA data bases, the number of matches between these data bases and the at-fault accident personnel of the ASMIS data base was too low to allow appropriate analyses. Finally, DMDC does not maintain ASVAB subtest scores for officers and warrant officers in its data base, and, U.S. Army pilots fall exclusively within the officer and warrant officer grade structures. As a result of these problems building the aviation data set, the analysis of aviation accidents was abandoned.

Ground Accidents. As with the aviation data set, a PROC FREQ was initially run on the ground accident data set. Unfortunately, the officer and National Guard/Reserve tapes provided by DMDC contained no valid entries. Therefore, the analysis of ground accidents was restricted to active Army enlisted personnel.

For the years of interest (1985 to 1990), there were approximately 56,000 at-fault accident individuals in the ASMIS data base. Of these, there were approximately 32,000 cases where the individual was enlisted, active Army, and the data base contained a valid SSAN. Of these 32,000 cases in the ASMIS data base, only 11,000 matched personnel in the DMDC data base. It is unknown why 21,000 at-fault accident individuals cannot be matched to the DMDC data base.

Further analysis of these 11,000 at-fault accident individuals was conducted. In order to analyze the 11,000 cases, a comparison group of nonaccident personnel was drawn from the nonaccident personnel in the DMDC data base. This nonaccident sample was chosen by a procedure which utilized a digit of the SSAN as a random number.

Data Base Analysis - Results

A correlation procedure (PROC CORR) was conducted to build a correlation matrix among the variables used in the ground accident analysis. Because of the large sample size (approximately 22,000), well over half of the variables (appendix B) correlated significantly with accident involvement. This is a statistical artifact found when large samples are used. There is a definite relationship between these variables and accident involvement. However, the individual variables explain so little of the outcome (of whether or not a person

will be involved in an accident), that, for all practical purposes, they are useless. No correlation was higher than 0.10.

However, one variable was an exception. The variable CODARS had a 0.11 correlation with accident involvement. CODARS is a data base which includes individuals who have been referred for drug or alcohol counseling. However, this high correlation is probably an artifact of the reporting process. If a person is involved in an accident which involves drugs or alcohol, he/she is automatically referred to the CODARS program. Also, the likelihood of a drug or alcohol problem being uncovered and the individual then being referred to CODARS is probably greater if the person has been involved in an accident. So, while involvement with drugs or alcohol might be good predictors of accident involvement, it was not supported by the data because it is not known how many military personnel have alcohol or drug problems, are not referred to CODARS, and do not have accidents. These data do not exist.

Finally, on the basis of earlier findings (reference 2), it was expected that strong relationships between certain ASVAB subtest scores and accident involvement would exist. Although many of the subtests did have a significant correlation with accident involvement, none of the correlations was high enough to be a practical predictor of accidents. It is not known why the data failed to replicate the results of earlier research. One reason could be that this accident data sample represented a different time period than that of the Beall study. Another reason for the discrepancy is that recently ASVAB data have been recorded as raw scores rather than percentiles. This inconsistency made accurate analysis of the ASVAB scores impossible.

Because of the low correlations between possible predictors and accident involvement and because data limitations did not permit multivariate analyses, the discriminant analysis (or some variation of it) originally planned for this study was not performed.

Method

A systematic review of 484 Class A-C Army aviation accidents attributed to human error was conducted by subject matter experts to: identify human errors due wholly or partly to indiscipline; match these errors to a preliminary list of high-risk behaviors provided by the USASC; refine the description of the preliminary list of high-risk behaviors to more accurately describe the behavior as indicated in the accident report; and compile a final, prioritized list of the most frequently occurring high-risk behaviors for subsequent field testing. A data extraction form was developed and used to document specific information about each accident case (appendix C). This information included the human performance errors and their causes, the duty position of the person committing the errors, and the type of high-risk behavior if the error was caused by indiscipline. Also, the analysts decided if the high-risk behavior was flagrantly or non-flagrantly committed. That is, if it was blatant, disgraceful, shocking, or outrageously evident, the analysts coded the behavior as flagrant.

Each accident case was analyzed by at least two aviation accident investigation experts who resolved any differences before entering the data into a computerized data base. When assigning a behavior type, the experts utilized a hierarchy of high-risk behaviors developed from a preliminary list of high-risk aviation behavior provided by the USASC. These behaviors were then refined to more accurately describe the behavior on the basis of information in the accident reports. As undefined high-risk behaviors were found in the accident reports, additional behavior types were developed, refined, and added to the list. A complete list of all the high-risk behaviors is located in appendix D.

In many instances, findings listed in the accident reports did not accurately identify errors caused by indiscipline, requiring further review of each accident case. The additional review allowed the researchers to better define the cause(s) of the accidents and to more precisely describe the high-risk behaviors that individuals displayed. Each instance of high-risk behavior identified during the initial review was reviewed again to attribute errors to either "individual failure" or "system failure." For an error to be caused by individual failure, it is required that clear and practical standards exist for the task being performed, that the aviation crewmember be trained to those standards, and that the chain of command enforce those standards. Errors resulting from inadequate written procedures or standards, institutional or unit training, coordination, or supervision were attributed to system failures.

The high-risk behaviors were sorted by major category (table 3) and specific subcategory (appendix E). Each of these categories was evaluated in terms of frequency of occurrence, cost, number of fatalities, number of injuries, and number of flagrant violations. A percentage was calculated for each of these five parameters. An additional value was calculated on the basis of the percentage of the individual high-risk behavior that were flagrant violations. The high-risk behaviors were prioritized using an average percentage value of the six parameters.

Table 3

HIGH RISK BEHAVIORS - MAJOR CATEGORY

HRB CATEGORY	FREQUENCY N = 97	COST N = $90,311,096	FAT N = 37	INJ N = 138	FLAG N = 48	% of FlagViol	AVG %
2.1 - Unauthorized Flight Maneuver/Violating Regulatory Guidance	22 (22.7%)	$24,540,297 (27.2%)	23 (62.2%)	33 (23.9%)	19 (39.6%)	(86.4%)	43.7
2.3 - Intentionally Operating Acft Unnecessarily Close to Obstacles	9 (9.3%)	2,806,480 (3.1%)	4 (10.8%)	9 (6.5%)	7 (14.6%)	(77.8)	20.4
1.0 - Flying Acft Without Performing or Improperly Performing Required Flight Planning Tasks	16 (16.5%)	27,219,299 (30.1%)	3 (8.1%)	20 (14.5%)	5 (10.4%)	(31.3%)	18.5
4.0 - Allowing Unsafe Acts in Flight (Supervisory Error)	8 (8.3%)	3,569,706 (4.0%)	2 (5.4%)	3 (2.2%)	6 (12.5%)	(75.0)	17.9
2.2 - Operating Acft Outside of Accepted Flight Envelope/Profile	13 (13.4%)	5,797,423 (6.4%)	3 (8.1%)	24 (17.4%)	6 (12.5%)	(46.2%)	17.3
2.6 - Failure to Follow Flight Procedures for Specific Flight Profile	19 (19.6%)	16,608,941 (18.4%)	1 (2.7%)	40 (29.0%)	3 (6.3%)	(15.8%)	15.3
2.5 - Failure to Follow Flight Procedures for Emergency or Near-emergency Situation	6 (6.2%)	7,413,311 (8.2%)	0 (0%)	7 (5.1%)	2 (4.2%)	(33.3)	9.5
2.4 - Failure to Ensure Sufficient Clearance from Obstacles (Search Error)	2 (2.1%)	1,285,657 (1.4%)	1 (2.7%)	0 (0%)	0 (0%)	(0.0)	1.0
3.1 - Allowing CP or other CM's to Incorrectly Perform their Duties	2 (2.1%)	1,069,982 (1.2%)	0 (0%)	2 (1.5%)	0 (0%)	(0.0)	0.8

A complete prioritized listing of the 44 specific categories of high-risk behavior with their associated numerical codes is located in appendix E. The 20 specific categories were limited to those high-risk behaviors with multiple occurrences and comprise page 1 of appendix E.

A questionnaire (appendix F) was developed to survey Army aviators about their personal experiences with high risk behavior, using the top 10 high-risk behaviors pertaining to pilot, copilot, or crewmembers from the prioritized list of high-risk behaviors (appendix E). The responses would provide the researchers with a baseline of high-risk behavior in Army aviation units by indicating frequency of high-risk behavior apart from accident data. The questionnaire was designed to determine how many times the respondent had actually performed, personally observed, or been told about others committing high-risk behavior actions. The high-risk behaviors in the questionnaire were presented randomly so the respondents would not be influenced by their order. Additional information was also sought concerning the degree of disciplinary action the respondent thought was appropriate for a first-offense commitment of an high-risk behavior. A limited amount of demographic data was included in the questionnaire, primarily to aid in correlating individual experience levels with the responses received, but anonymity was maintained to encourage honest responses. The questionnaire was pretested using a group of aviators attending the Aviation Safety Officer (ASO) Course at Fort Rucker, Alabama. On the basis of these results, refinements were made to the questionnaire.

A review of ARs was conducted to determine the administrative actions presently available to commanders to preclude high-risk behavior. Several documents including the phase 1 final report, Inadequate Self-discipline as a Causal Factor in Human Error Accidents (Runcie, 1991), (reference 1) the Personal Accountability Survey (Runcie, 1991), (reference 3) an article in Professional Safety, Motivational Management Techniques for Safety and Health (Gregory, 1991), (reference 4) and the Aircrew Coordination Training Handbook (Geis & Alverado, 1989), (reference 5) were reviewed to obtain information about potential risk management techniques. Two candidate risk management techniques were developed for implementation in aviation units. A brief survey was conducted to assess the willingness of aviation unit commanders and Army aviators to implement or support the two techniques in their units (appendix G). The survey was administered to attendees to the Aviation Pre-Command Course (PCC) and the ASO Course at Fort Rucker, Alabama. The techniques were then refined on the basis of the results of the survey.

Results

Accident Case Review

Of the 484 accident cases analyzed, 80 cases were rejected for the reasons shown in table 4:

Table 4

Reasons for Rejected Accident Cases

Total Accidents Reviewed	484
Accidents Rejected	80
Preliminary Report of Aircraft Mishap (PRAM) Only	25
No Human Error	40
Insufficient Information	10
No Aviation Crew Error	5
Total Accidents in Data Base for Analysis	404

Of the 404 accident cases remaining for analysis, 89 cases contained a total of 97 separate instances of high-risk behavior caused by individual failure. From these instances, eight major categories and 40 subcategories of high-risk behavior types were identified (appendix D). There were an additional five subcategories and one major category for aviation supervisors. High-risk behavior was involved in over 20 percent of the analyzed accident cases, with approximately half of those occurrences involving flagrant violations of regulations or procedures. The most commonly occurring type of high-risk behavior involved unauthorized aerobatics, return-to-target maneuvers, or "buzzing" ground vehicles. Table 5 depicts general information about the sample including accident classifications, number of fatalities, number of injuries, overall costs, and the number and percentage of cases containing instances of high-risk behavior.

Table 5			
General Information about the Data Sample			
	Total	No. w/HRB	% w/HRB
Accidents	404	89	22%
Class A	142	48	34%
Class B	42	7	17%
Class C	220	34	15%
Fatalities	147	37	25%
Injuries	387	138	36%
Cost	$292,329,211	$90,311,096	31%

Table 6 depicts the number of high-risk behavior occurrences found in 89 cases and a comparison between the flagrant and non-flagrant errors.

Table 6			
Comparison of Flagrant and Non-flagrant HRB Occurrences			
	Total*	Flagrant	Non-Flagrant
Errors	97	48	49
Class A	54	28	26
Class B	7	3	4
Class C	36	17	19
Fatalities	37	32	5
Injuries	138	71	67
Cost	$90,311,096	$39,860,704	$50,450,392

* 89 Aviation Accidents

During the initial accident case reviews, the analysts determined that the broad definition of high-risk behavior (human errors due wholly or partly to indiscipline) could not be used without a detailed review of the accident report. Review of only the findings and recommendations was not adequate for the purpose of this study. It was clear from the evidence in the accident reports that the systemic sources of error reported for some accidents, even though categorized as indiscipline, described system failures rather than individual failures and did not truly represent high-risk behavior. For instance, many occurrences of high-risk behavior category 2.4, Failing to ensure sufficient clearance from obstacles, reflected training or procedural problems rather than individual failures, even though individual failure was cited as the cause. The analysts reexamined the accident cases to separate errors caused by individual failure from those caused by inadequate written procedures, institutional or unit training, supervision or coordination (system failures). This resulted in substantially fewer accidents with high-risk behavior within this data sample than found in previous analyses based only on reported causes with no detailed case review.

The following definition of aviation high-risk behavior was developed for use during all subsequent case analyses:

"Personnel who operate aviation equipment or who manage or supervise personnel and equipment, exhibit high-risk behavior when they knowingly make errors of their own volition (indiscipline), placing aviation personnel or equipment at a level or risk exceeding that necessary for mission accomplishment. Indiscipline includes inadequate composure, attention, and motivation, as well as overconfidence, lack of confidence, self-imposed fatigue, or alcohol/drug abuse. In the absence of other systemic sources associated with inadequate written procedures, institutional/unit training, or supervision, the high-risk behavior is attributed to individual failure. High-risk behavior can be either flagrant or non-flagrant."

AR 600-105 Review

A review of AR 600-105 (reference 6) was conducted to determine the adequacy of the Army system in dealing with high-risk behavior. Although high-risk behavior is not specifically addressed, the regulation does give a commander the authority to impose an immediate, non-medical, temporary suspension from flying duty for up to 30 days for, among other reasons, flagrant violation of flying regulations. The regulation further recommends the convening of a Flying Evaluation Board (FEB) in the case of a flagrant violation. FEBs can recommend administrative actions as severe as permanent disqualification of an aviator from aviation service. The regulation also states that disciplinary action under the provisions of the Uniform Code of Military Justice may be initiated against aviators as punishment for the violation of flying or other regulations.

Other tools not mentioned in AR 600-105, but frequently used by aviation commanders include informal and formal verbal counseling and letters of reprimand which may or may not be forwarded to the custodian of the aviator's official military personnel file.

Aviator Survey Pretest Data

The questionnaire (appendix F) used to determine the high-risk behavior baseline for unit aviators was pretested on 39 Army aviators attending the ASO Course at Fort Rucker, Alabama. Complete results of the pretest are located in appendix H. This group of aviators was somewhat atypical due to their age (which averaged 38.7 years), length of aviation service (which averaged 13.5 years), and overall flight experience (which averaged 2,789 hours). Well over one third of the aviators had combat experience which, before Operation Desert Storm, would have been unusual in the average Army aviation unit. This experience and flight time aberration were likely due to the high percentage of National Guard/Reserve aviators in the class. With that in mind, results of the survey revealed a pattern in the aviators' responses regarding the increasing frequency of high-risk behavior as the questions progressed from those personally committed to those only heard about. Furthermore, the same five types of high-risk behavior, albeit in differing order, had the highest frequency of occurrence for all three types of responses. (See table 7.)

	Table 7			
	Order of Occurrence Comparison Between Accident Data and Aviator Survey Pretest			
	Accident Data/Order of Occurrence	Survey Order of Occurrence		
		Performed	Observed	Heard About
1.	Performing unauthorized aerobatics	4	5	5
2.	Flying in illegal or unacceptable weather	5	4	3
3.	Operating too close to obstacles	9	9	10
4.	Failing to perform or improperly performing required performance planning tasks	1	2	2
5.	Incorrectly following emergency procedures for engine malfunctions	10	8	9
6.	Exceeding airspeed, power, or RPM limits	6	7	8
7.	Not documenting hazard maps	2	1	4
8.	Not completing preflight checks	8	6	6
9.	Exceeding crew endurance limits	3	3	1
10.	Exceeding fuel endurance limits	7	10	7

Results of the pretest indicated that the most frequently occurring high-risk behaviors were associated with improper performance planning, exceeding crew endurance, or improperly documenting hazard maps. Improper performance planning was the only one of these in the top five most frequently occurring high-risk behaviors according to the accident data. Correlations were generated, using the Pearson Product Moment Correlation, between each paired combination of the three scales (e.g., performed, observed, and heard about) to determine if any of the scales duplicated information contained in one of the other scales. The correlations between the three scales were statistically significant at the 0.01 level, but not large enough to justify eliminating any one of the three scales. Table 8 shows results of these correlations. On the basis of results of the pretest and the suggestions provided by the respondents, the questionnaire was revised and two more scales were added. The refined questionnaire is shown in appendix I. Deployment of U.S. Army Forces to Operation Desert Shield/Storm left insufficient time and resources to properly conduct the survey using the refined questionnaire.

Table 8

Aviator Survey Internal Correlations

Correlation Coefficient X: Performed Y: Observed

Count:	Covariance:	Correlation:	R-squared:
390	1.316	0.685	0.469

99% confidence level = 0.610 -0.748

Correlation Coefficient X: Performed Y: Heard About

Count:	Covariance:	Correlation:	R-squared:
390	0.641	0.334	0.112

99% confidence level = 0.215 -0.445

Correlation Coefficient X: Observed Y: Heard About

Count:	Covariance:	Correlation:	R-squared:
390	1.179	0.598	0.357

99% confidence level = 0.505 -0.675

Risk Management Techniques

In developing risk management techniques which target the high-risk behaviors in table 3 and which would have minimal impact on unit administration and normal operating procedures, several potential techniques were considered and rejected. The point system proposed in the phase 1 final report (reference 1) contains several flaws. First, it requires a formal reporting and recording system not presently available to the aviation unit commander. The proposal fails to mention who will report, investigate, and verifiy the reported violations. It also assumes a non-existent automated tracking system (DA Form 759) for recording the results. Second, the system usurps the commander's authority for enforcing the organizational safety climate by establishing a committee to discipline unsafe behavior. According to the proposal, the commander can reduce by 1 point the points assigned only if he puts it in writing. This is considered an unrealistic requirement. Finally, the criteria for initiating administrative actions are counterproductive. Allowing 10 points in 1 year or 15 points in 2 years before taking action tells pilots that, in essence, it is acceptable to flagrantly violate rules and regulations as long as you do not do it too often.

A proposal to encourage commanders to utilize existing administrative actions to preclude unsafe behavior was also considered but rejected on the basis of results of a study (reference 3) which assessed accountability for at-fault accidents during fiscal years 86 and 87 and compared these results with those of fiscal years 82 and 83. The researchers found that aviators who exhibited high-risk behavior which led to accidents during the most recent time period received favorable personnel actions at a rate almost three times that of unfavorable actions following the accident. During the earlier time period, this ratio was also 3 to 1, indicating little or no improvement in holding at-fault aviators accountable for unsafe actions. This is especially significant since the Army Vice Chief of Staff personally initiated a major campaign to improve accountability following the first study in 1984.

Another proposal to establish an awards program for not committing high-risk behavior (similar to the awards program for accident-free flying) was considered but rejected primarily because of the negative connotation associated with presenting an award to someone for not flagrantly violating procedures. Also, like the point system previously discussed, it would require a formal reporting and recording system which would have a significant impact on unit administration.

A review of the course outline and teaching materials for the Aircrew Coordination Training (ACT) program provided by Geis-Alverado & Associates (reference 5) revealed that it emphasizes "soft" concepts such as management theory, group dynamics, and interpersonal relations. Like other ACT programs currently available in the military and civilian aviation community, these concepts are not compatible with the Aviation Branch's emphasis on Aircrew Training Manual (ATM) tasks, conditions, and standards format which characterizes Army aviation training and operations.

Two high-risk management techniques were deemed appropriate for implementation in aviation units and are described in the following paragraphs. One of these techniques emphasizes education and the other emphasizes reinforcement/enforcement. Both techniques require aviation unit commanders to survey unit aviators to identify their perception

of the safety climate within the command. Because management of high-risk behavior is a cooperative effort between unit leaders and aviators, it is important to understand the unit aviator's perception of the organization's safety climate. This perception strongly influences his/her behavior on the job and the desire to learn from, and respond to, these programs. The overall safety climate of a unit can have a significant effect, both positive and negative, on individual aviator behavior. The Safety Climate Assessment Form contained within appendix G was developed to analyze the organization's safety climate. It should be administered to all unit aviators who have been assigned for at least 6 months. The completed forms should be anonymously submitted to a unit point of contact, possibly the ASO, who would keep the responses confidential and provide the commander with a summary. The results, which should be shared with all participants, will show how unit aviators view the safety climate and where corrective actions should be concentrated. Followup surveys may be appropriate to determine if progress has been made and in which areas further work is required.

Education Program

The first technique involves educating leaders and unit aviators about high-risk behavior. In order to use the administrative actions available, commanders must know precisely what constitutes high-risk behavior, each type of high-risk behavior's relative level of severity (on the basis of cost, number of fatalities/injuries, and flagrant violations), and the appropriate corrective action to preclude further occurrence. Because management of high-risk behavior is both an individual (aviator) and leadership (commander) responsibility, unit aviators should also be included in this program. The High Risk Behavior/Corrective Action matrix contained within appendix G portrays the various high-risk behaviors that have resulted in accidents, their rank among high-risk behavior types, and suggested corrective actions. This matrix and the Prioritized List of Specific High-Risk Behavior Types in appendix E should be used by commanders and ASOs to develop a class to be given during unit-level safety meetings. Additionally, this information should be distributed to all attendees of the Aviation PCC. The matrix and a brief explanation of the information should also be published in FlightFax, Aviation Digest, and other aviation-related publications. Providing aviators and commanders with descriptions of high-risk behavior, the severity of accidents involving/caused by these behaviors, and appropriate corrective actions may motivate aviators to perform to standards and commanders to act when high-risk behavior occurs.

Reinforcement/Enforcement Program

The second technique requires commanders to establish positive reinforcement techniques to encourage proper behavior. In modifying behavior, psychologists suggest that tighter control over people is not the only answer. Positive reinforcement rather than punishment and discipline is recommended as much more effective in changing human behavior. Positive reinforcement is the act of rewarding a person for his/her actions in order to encourage the recurrence of the behavior. One of the most effective rewards is recognition and personal praise from the commander. For example, if a pilot in command, air mission commander, or flight leader properly determines the weather or other environmental conditions to be less than that required for successful mission accomplishment and

delays or cancels the mission, the commander should publicly commend the aviator for the decision. Likewise, when a unit aviator chooses not to fly because he is fatigued or ill and this condition is confirmed by the flight surgeon, the commander should openly praise the aviator's judgment. Even when an aviator makes a mistake; i.e., improper fuel planning, but decides to land short of destination and call for assistance, the commander should emphasize the correct decision to land short versus the planning error because continuing the mission might have resulted in a catastrophic accident.

Of course, when the commander learns of an aviator who has displayed high-risk behavior, he should take swift and appropriate corrective action and ensure all other unit aviators are aware of the infraction and the consequences. The ultimate goal of this reinforcement/enforcement program is to encourage each unit aviator to perform properly and make-on-the spot corrections so that everyone understands that proper behavior is recognized and high-risk behavior is not condoned within the unit.

Risk Management Techniques Survey Results

The survey was administered to 13 field grade aviation officers (lieutenant colonels and colonels) attending the Aviation PCC and 34 warrant and commissioned officer aviators attending the ASO Course. The PCC attendees are programmed to command aviation brigades and battalions, and the ASO attendees are aviators who will return to their units as qualified safety officers. The survey was administered to the ASO attendees during normal class time, whereas the PCC attendees were asked to complete the survey after normal class time and were provided a pre-addressed envelope in which to return the survey. All 34 ASO Course surveys were completed and returned; however, only three of the 13 PCC surveys were returned.

The results of the ASO survey indicated overwhelming support for the education program but less than enthusiastic support for the reinforcement/enforcement program. Every respondent (100 percent) answered all three questions positively for the education program. They believed this program could be implemented with minimal impact on unit administration and indicated they would support it in their units. However, almost 63 percent of the respondents indicated that the reinforcement program could not be implemented with minimal impact on unit administration and operating procedures. When asked whether they would support the program in their unit and whether they believed other ASOs would support it in their units, 38 percent and 30 percent, respectively, answered negatively. There were several common suggestions and comments provided by the ASO respondents including:

- many commanders are high-risk aviators (mission-oriented, Officer Efficiency Report driven)
- enforcement program requires strong support from chain of command,
- enforcement program ties the commander's hands,
- delete corrective action matrix, leave to commander's discretion,
- some corrective actions for nonflagrant violations too severe, and
- institute education program in Initial Entry Rotary Wing (IERW), Instructor Pilot (IP) Course, Advance Course, PCC, etc.

The results of the PCC survey were inconclusive based on the few attendees who returned their surveys. Two of the three respondents answered all three questions negatively, indicating that adequate policies were already in place in which to deal with this problem. They especially did not want the USASC to establish "fixed rules" for corrective actions to deal with high-risk behavior which would limit the actions available to commanders.

INTENTIONALLY LEFT BLANK

CONCLUSIONS AND RECOMMENDATIONS

PREDICTING INDISCIPLINE

CONCLUSIONS:

Computerized data bases were able to provide information pertaining to only 11 of the 21 identified indicators of indiscipline. ASMIS provided information pertaining to only four of the indicators. Additional measures are necessary to collect adequate information to support the compilation of a computer file on Army personnel which would assist in predicting indiscipline.

Because of missing fields and inconsistencies in data that were obtained, statistical analysis was not successful in predicting indiscipline or demonstrating a significant relationship between the 11 indicators of discipline and a person's likelihood to have an accident.

Although the results of this research effort were not as fruitful as hoped, there were some important lessons and findings. First, many of the data bases that might have provided the more logical variables related to accidents (e.g., U.S. Courts, NDR) were impossible to access, primarily due to legal restrictions. Second, many of the data bases that were accessed appeared to be inconsistently maintained, resulting in a majority of observations being discarded. Third, of the variables that were included in the study, none yielded a strong practical relationship to accident involvement. These findings differ from those of Beall (1972), (reference 2) who reported strong significant relationships between accidents and two of the ASVAB subtests (Coding Speed and Arithmetic Reasoning).

RECOMMENDATION:

USASC attempt to collect data on Army individuals pertaining to the indicators of indiscipline during the accident investigation process. This could be done by modifying existing investigation instructions to include specific inquiries and appropriate background investigations of individuals involved in Army accidents. Information should be collected on personnel at fault and not at fault, including witnesses, passengers, and others selected by the accident board. This would provide USASC, over time, information on accident and non-accident groups pertaining to the indicators of indiscipline. These data could then be used analytically to predict indiscipline and subsequently serve as the basis for the modification of recruitment and assignment procedures.

MOTIVATIONAL MANAGEMENT SYSTEM

CONCLUSIONS:

Accidents resulting from high-risk behavior are a significant problem in Army aviation. Previous attempts to reduce this problem through increased emphasis on personal accountability and the use of negative enforcement programs have been largely unsuccessful. Information pertaining to the specific types of high-risk behavior, the severity of accidents

resulting from them, and methods to alleviate the problem have not been readily available to the aviation community.

Army accident investigations have incorrectly attributed errors to causes associated with indiscipline when, in fact, many of these errors resulted as much from system as individual failures. That is, the evidence in the accident reports indicates that many of the errors were caused by other systemic sources such as inadequate written procedures or training.

The present taxonomy for identifying errors and their causes requires modification. Many accident reports within the sample listed an error of improper inattention with a corresponding cause of inadequate attention. In those cases, the reports did not reveal why the crewmember's attention was improper or inadequate. That is, they failed to specify whether the crewmember's attention was inside the cockpit at the wrong time, diverted by another task, or whether he was simply overtasked and unable to cope with the situation. The level of crew coordination among the crewmembers was not normally addressed. Crew coordination training or training designed to teach crewmembers techniques to divide their attention, scan, monitor, survey, or time share more effectively in terrain flight or night environments may be valid techniques to improve attention.

The proposed risk management technique to educate the aviation community about high risk behavior was generally well received even though there were some negative comments about the suggested corrective actions matrix. Several respondents felt that the suggestions would become "fixed rules" and would limit the actions available to commanders. Others indicated that it would require uncharacteristically strong support from the entire chain of command to execute. The reinforcement/enforcement technique was less than enthusiastically received, primarily because of its use of the high-risk behavior corrective action matrix. Several of the aviator respondents did not believe the positive enforcement examples were realistic, on the basis of their past experience with support from their chain of command. However, on the basis of the Army's previous unsuccessful attempt to reduce high-risk behavior which basically allowed maximum latitude to commanders in punishing offenders, and was based on negative enforcement actions, it appears that some changes are needed. These changes should include consistent guidance for corrective action and a philosophical shift in the manner in which the program is enforced.

Survey pretest results indicate that the types of high-risk behavior exhibited in Army accident reports are not necessarily the types of high-risk behavior most frequently committed by aviators in the field. However, the pretest aviator sample was atypical from a normal Army aviator cross section in terms of age, length of service, total flight time, and combat flight time. Consequently, the sample may not have provided an accurate high-risk behavior baseline in aviation units.

RECOMMENDATIONS:

During the investigation of Army accidents, care should be taken to properly discriminate between errors caused by individual and those caused by system failures. Additionally, coding procedures should be developed to enter these errors into ASMIS so high-

risk behavior (flagrant and non-flagrant) may be retrieved independently of associated errors and causes.

The USASC should revise the current 3W taxonomy used by accident investigators to eliminate inadequate attention as a system cause for human error in order to force investigators to identify the systemic cause of inattention.

The Army should institute the proposed education and reinforcement/enforcement techniques contained in this study for combating high-risk behavior committed by aircrewmembers. The education program should be implemented at unit and institutional level. Commanders and ASOs should develop classes on high-risk behavior for presentation during unit safety meetings. Aviation unit commanders should receive information on high-risk behavior while attending the Aviation PCC. The corrective action matrix and a brief explanation of the information concerning high risk behavior should be published in FlightFax, Aviation Digest, or other aviation-related publications.

Aviation unit commanders should establish positive reinforcement techniques to encourage proper behavior. Use of suggested corrective actions when disciplining aviators who have exhibited high-risk behavior is recommended.

If further data are needed to establish a base line of high-risk behavior in Army aviation units, the USASC should administer the refined survey developed by this study to a larger sample of Army aviation personnel. The survey should be administered either by direct mail or on site by a disinterested third party in order to assure survey participants that their responses would be kept confidential.

INTENTIONALLY LEFT BLANK

APPENDIX A

RECRUITMENT FILE FACTORS RELATED TO ACCIDENTS

INTENTIONALLY LEFT BLANK

Recruitment File Factors Related to Accidents*

Reference	Previous Traffic Violations	Previous Accident History	Driving Experience **	Type of Driver Training **	Military Rank	Years of Military Service	DUI, Alcohol, and Drugs	Non-traffic Disciplinary Offenses	Criminal Offenses	Early Socialization and Parental Relations **	IQ and Aptitude	Socioeconomic Status **	Education Level	Age	Age at Enlistment	Job Type and Level	Marital Status	History of Life Events and Changes	Negative Peer Relations **	Uneven Work Record
Beall (1972)	X				X	X	X	X	X		A			X						
Beshai (1984)							X													
Clayton (1985)			X											X						
Ferguson et al. (1984)											B		X		X					
Finn & Bragg (1986)														X						
Hanson (1988)							X	C	X									D		
Harano (1975)	E								X					X						
Jonah (1986)														X						
Kadell & Peck (1984)	E																			
Koz (1984)		X								X	F,G	X								
Majors (1984)								H										X	X	
McGuire (1976)								C		I,J				X						X
McKenna (1983)		X																		
Peck (1985)	K													X						
Pestonjee et al. (1980)	X		X											X			X			
Plant et al. (1984)							X													
Risser (1985)		L																		
Sanders (1964)																X				
Sipes (1986)																			X	X
Voicu & Nereuta (1985)											M									
Wilde (1976)										N			X							
Williams et al. (1974)				X								X		X		X				

* Factors denoted by the letter X are generic in that they are no more specific than the factor names themselves. However, factors denoted by the letters A through N refer to elements which are more specific than the factor names.

** The factors could be obtained from enlistment interview or obtained from "request for waiver disqualification" form. The other factors come directly from the recruitment file. This information was obtained from an Army Recruitment Office.

INTENTIONALLY LEFT BLANK

APPENDIX B

DATA FIELDS SELECTED FOR ANALYSIS

INTENTIONALLY LEFT BLANK

DATA FIELDS SELECTED FOR ANALYSIS

Ground Accident Data Set

Identifiers

- Accident Entry Number
- Name
- SSAN
- Date of Accident
- Date of Birth
- Basic Active Service Date

Categorical Variables

- Ground Accident (yes/no)
- Accident Year
- Grade
- Sex
- MOS (Current at Accident)
- Day of Accident (Mon-Sun)
- Time of Accident (0030-2400)
- Month of Year
- Type of Accident
- Type of Activity
- Type of Equipment
- Period of the Day
- Race
- Marital Status
- Classification of Accident
- Physical Location of Accident
- State of Accident
- Character of Service

Continuous Variables

- Grade
- Age (at Time of Accident)
- Years of Service
- AFQT%
- Ed. Level
- Ed. Distinguisher
- ASVAB-GS
- ASVAB-AR
- ASVAB-WK
- ASVAB-PC
- ASVAB-NO
- ASVAB-CS
- ASVAB-A/S
- ASVAB-MK
- ASVAB-MC
- ASVAB-EL

Aviation Accident Data Set

Identifiers

- Accident Entry Number
- Name
- SSAN
- Date of Accident
- Date of Birth
- Basic Active Service Date

Categorical Variables

- Aviation Accident (yes/no)
- Accident Year
- Grade
- Sex
- MOS (Current at Accident)
- Day of Accident (Mon-Sun)
- Time of Accident (0030-2400)
- Month of Year
- Type of Aircraft
- Period of the Day
- Race
- Marital Status
- Classification of Accident
- Physical Location of Accident
- State of Accident
- Character of Service
- FAA/DEV
- FAA/EIS
- FAA/AID
- NTSB

Continuous Variables

- Grade
- Age (at Time of Accident)
- Years of Service
- AFQT%
- Ed. Level
- Ed. Distinguisher
- ASVAB-GS
- ASVAB-AR
- ASVAB-WK
- ASVAB-PC
- ASVAB-NO
- ASVAB-CS
- ASVAB-A/S
- ASVAB-MK
- ASVAB-MC
- ASVAB-EL
- Selfscr (Afast)
- Bginfo (Afast)
- Incomscr (Afast)
- Plxmvesc (Afast)
- Helscr (Afast)
- Cycser (Afast)
- Mechscr (Afast)
- Equscr (Afast)
- Selfdes (Rfast)
- Biodes (Rfast)
- Incomp (Rfast)
- Plxmve (Rfast)
- Helknow (Rfast)
- Cyclor (Rfast)
- Mechfun (Rfast)
- Compgrde (Rfast)

INTENTIONALLY LEFT BLANK

APPENDIX C

DATA EXTRACTION FORM

INTENTIONALLY LEFT BLANK

MOST FREQUENTLY VIOLATED AVIATION PROCEDURES/INDICATORS OF INDISCIPLINE -- CASE REVIEW SHEET

Case # ____________ Reviewer ____________

Identify the procedure governing correct performance that was not complied with and the duty position of the individual committing the error. Relate the appropriate task error and system inadequacy(s) to that reference. Indicate the phase of flight when the error occurred. Where appropriate, indicate the type of high risk behavior, whether the error was a flagrant violation or not, the activity, job, or task being performed when the error occurred, and additional reference.

Reference ____________ Duty Position ______ TE______ SI _____ Behavior Type ____F/N ____

Chapter ______ ATM Task # ______ SI _____ Behavior Type ____F/N ____

Para ______ Note # ______ TD# ______ P/F ______ SI _____ Behavior Type ____F/N ____

Page ______ Standard # ______ TC ______ SI _____ Behavior Type ____F/N ____

Task/Job/Activity Being Performed ____________ SI _____ Behavior Type ____F/N ____

Additional Reference ____________

Reference ____________ Duty Position ______ TE______ SI _____ Behavior Type ____F/N ____

Chapter ______ ATM Task # ______ SI _____ Behavior Type ____F/N ____

Para ______ Note # ______ TD# ______ P/F ______ SI _____ Behavior Type ____F/N ____

Page ______ Standard # ______ TC ______ SI _____ Behavior Type ____F/N ____

Task/Job/Activity Being Performed ____________ SI _____ Behavior Type ____F/N ____

Additional Reference ____________

Reference ____________ Duty Position ______ TE______ SI _____ Behavior Type ____F/N ____

Chapter ______ ATM Task # ______ SI _____ Behavior Type ____F/N ____

Para ______ Note # ______ TD# ______ P/F ______ SI _____ Behavior Type ____F/N ____

Page ______ Standard # ______ TC ______ SI _____ Behavior Type ____F/N ____

Task/Job/Activity Being Performed ____________ SI _____ Behavior Type ____F/N ____

Additional Reference ____________

Reference ____________ Duty Position ______ TE______ SI _____ Behavior Type ____F/N ____

Chapter ______ ATM Task # ______ SI _____ Behavior Type ____F/N ____

Para ______ Note # ______ TD# ______ P/F ______ SI _____ Behavior Type ____F/N ____

Page ______ Standard # ______ TC ______ SI _____ Behavior Type ____F/N ____

Task/Job/Activity Being Performed ____________ SI _____ Behavior Type ____F/N ____

Additional Reference ____________

INTENTIONALLY LEFT BLANK

APPENDIX D

LIST OF HIGH-RISK BEHAVIOR TYPES

INTENTIONALLY LEFT BLANK

AVIATION HIGH RISK BEHAVIOR (HRB)

Personnel who operate aviation equipment or who manage or supervise aviation personnel and equipment exhibit high-risk behavior when they knowingly make errors of their own volition (indiscipline) that place aviation personnel or equipment at a level of risk that exceeds that necessary for mission accomplishment. Indiscipline includes inadequate composure, attention, and motivation as well as overconfidence, lack of confidence, and self imposed fatique and alcohol or drug abuse. High-risk behavior can be either flagrant or non-flagrant.

(Note: Some categories have been intentionally omitted.)

AVIATION HIGH RISK BEHAVIORS
(Pilots/Copilots/CrewMembers)

1. FLYING AIRCRAFT WITHOUT PERFORMING OR IMPROPERLY PERFORMING, REQUIRED FLIGHT PLANNING TASKS

1.1 Mission/crew briefing (designating crew duties/responsibilities)
1.2 Weather/NOTAM checks
1.3 Performance planning (power, fuel, weight/balance)
1.4 Documenting hazard maps (wires, obstructions)
1.5 Completing flight plans (route planning)
1.6 Completing aircraft preflight/equipment checks
1.7 Completing before takeoff/landing checks
1.8 Performing proper route/landing zone reconnaissance

2. PERFORMING UNSAFE ACTS IN FLIGHT

2.1 Unauthorized flight maneuvers/violating regulatory guidance
2.1.1 Aerobatics/"buzzing" ground vehicles/return-to-target maneuvers
2.1.3 Flying aircraft into unacceptable/illegal weather conditons
2.1.4. Allowing nonrated personnel to fly aircraft
2.1.5 Flying while fatigued or in violation of unit crew endurance policy
2.1.6 Violating local traffic separation criteria

2.2 Operating aircraft outside of accepted flight envelope/profile
2.2.2 Exceeding airspeed, power, or RPM limitations
2.2.3 Exceeding fuel endurance limitations
2.2.4 Exceeding other aircraft systems' limitations
2.2.5 Operating in conditions conducive to Loss of Tail Rotor Effectiveness (LTE)

2.3 Intentionally operating aircraft unnecessarily close to objects
2.3.1 Another aircraft
2.3.2 Buildings/structures
2.3.3 Vegetation/terrain
2.3.4 External load

2.5 **Failing to correctly follow procedures for emergency or near emergency situations**
2.5.1 Engine, fuel control, governor malfunctions
2.5.3 Flight control malfunctions
2.5.4 Other aircraft malfunctions
2.5.6 Loss of visual contact with the ground and/or obstacle
2.5.9 Landing gear malfunction

2.6 **Failing to correctly follow flight procedures for specific flight profiles**
2.6.1 Landing/hovering in snowdust
2.6.2 Slope operations
2.6.4 Night Vision Goggle approach
2.6.6 Confined area takeoff
2.6.7 Power approach/precision landing
2.6.8 In-flight join-up
2.6.12 Takeoff in snow/dust
2.6.14 Negotiate wire obstacles
2.6.16 High overhead approach
2.6.18 Steep turn

2.4 **Failing to ensure sufficient clearance from obstacles**
2.4.1 Crewmember was not searching/scanning
2.4.5 Crewmember searched, saw obstacle, but misjudged distance/closure rate/etc

3. **ALLOWING UNSAFE ACTS IN FLIGHT**

3.1 **Allowing copilot or other crewmembers to incorrectly perform duties**
3.1.4 Obstacle clearance responsibilities
3.1.6 Practice emergency maneuver

AVIATION HIGH RISK BEHAVIORS
(Supervisors/Leaders/Commanders)

4. **ALLOWING UNSAFE ACTS BEFORE FLIGHT**
4.15 Failing to establish or enforce crew endurance policies
4.16 Authorizing or participating in prohibited actions such as directing or allowing aviators to fly in unacceptable weather conditions
4.19 Assigning personnel to perform missions or tasks outside the capability of the aircraft or personnel (i.e., crew selection)
4.21 Failing to ensure hazard maps or other area hazards are properly documented
4.23 Allowing personnel to perform without correction, actions prohibited by written, oral, or commonly accepted guidelines (i.e., altitude restrictions)

APPENDIX E

PRIORITIZED SPECIFIC CATEGORIES OF HIGH-RISK BEHAVIOR

INTENTIONALLY LEFT BLANK

TOP 20 HIGH RISK BEHAVIORS - SPECIFIC CATEGORY

	HRB FREQ.		COST		FATALITIES		INJURIES		FLAGRANT			
HRB	NO.	%	$	%	NO.	%	NO.	%	NO.	%	% FLAG/FREQ	AVG %
2.1.1	11	11.34%	$10,947,638	12.12%	15	40.54%	15	10.87%	11	22.92%	100.00%	32.96%
2.1.3	6	6.19%	$8,960,873	9.92%	7	18.92%	12	8.70%	5	10.42%	83.33%	22.91%
2.3.3	3	3.09%	$1,868,516	2.07%	4	10.81%	0	0.00%	3	6.25%	100.00%	20.37%
1.3	3	3.09%	$695,670	0.77%	0	0.00%	5	3.62%	3	6.25%	100.00%	18.96%
2.5.1	2	2.06%	$2,330,432	2.58%	0	0.00%	2	1.45%	2	4.17%	100.00%	18.38%
2.2.2	6	6.19%	$4,998,207	5.53%	3	8.11%	18	13.04%	4	8.33%	66.67%	17.98%
2.3.1	2	2.06%	$89,535	0.10%	0	0.00%	0	0.00%	2	4.17%	100.00%	17.72%
4.19	4	4.12%	$716,662	0.79%	0	0.00%	1	0.72%	3	6.25%	75.00%	14.48%
2.3.2	3	3.09%	$824,250	0.91%	0	0.00%	9	6.52%	2	4.17%	66.67%	13.56%
1.4	2	2.06%	$4,924,330	5.45%	0	0.00%	6	4.35%	1	2.08%	50.00%	10.66%
1.6	3	3.09%	$11,388,340	12.61%	1	2.70%	1	0.72%	1	2.08%	33.33%	9.09%
2.1.5	3	3.09%	$4,604,072	5.10%	1	2.70%	6	4.35%	1	2.08%	33.33%	8.44%
2.2.5	3	3.09%	$438,842	0.49%	0	0.00%	5	3.62%	1	2.08%	33.33%	7.10%
2.2.3	3	3.09%	$216,592	0.24%	0	0.00%	0	0.00%	1	2.08%	33.33%	6.46%
1.7	4	4.12%	$9,383,161	10.39%	0	0.00%	8	5.80%	0	0.00%	0.00%	3.39%
2.6.4	3	3.09%	$6,472,137	7.17%	0	0.00%	10	7.25%	0	0.00%	0.00%	2.92%
2.6.1	4	4.12%	$1,577,859	1.75%	0	0.00%	5	3.62%	0	0.00%	0.00%	1.58%
2.6.2	4	4.12%	$2,024,022	2.24%	0	0.00%	4	2.90%	0	0.00%	0.00%	1.54%
2.6.14	2	2.06%	$2,499,090	2.77%	0	0.00%	1	0.72%	0	0.00%	0.00%	0.93%
1.1	2	2.06%	$166,041	0.18%	0	0.00%	0	0.00%	0	0.00%	0.00%	0.37%

REMAINING HIGH RISK BEHAVIORS - SPECIFIC CATEGORY (CONTINUED)											
	HRB FREQ.		COST		FATALITIES		INJURIES		FLAGRANT		
HRB	NO.	%	$	%	NO.	%	NO.	%	NO.	%	% FLAG/FREQ
1.2	1	1.03%	$630,221	0.70%	2	5.41%	0	0.00%	0	0.00%	0.00%
1.8	1	1.03%	$31,536	0.03%	0	0.00%	0	0.00%	0	0.00%	0.00%
2.1.4	1	1.03%	$15,000	0.02%	0	0.00%	0	0.00%	1	2.08%	100.00%
2.1.6	1	1.03%	$12,714	0.01%	0	0.00%	0	0.00%	1	2.08%	100.00%
2.2.4	1	1.03%	$143,782	0.16%	0	0.00%	1	0.72%	0	0.00%	0.00%
2.3.4	1	1.03%	$24,179	0.03%	0	0.00%	0	0.00%	0	0.00%	0.00%
2.4.1	1	1.03%	$1,259,389	1.39%	1	2.70%	0	0.00%	0	0.00%	0.00%
2.4.5	1	1.03%	$26,268	0.03%	0	0.00%	0	0.00%	0	0.00%	0.00%
2.5.3	1	1.03%	$4,654,210	5.15%	0	0.00%	3	2.17%	0	0.00%	0.00%
2.5.4	1	1.03%	$57,751	0.06%	0	0.00%	0	0.00%	0	0.00%	0.00%
2.5.6	1	1.03%	$349,382	0.39%	0	0.00%	2	1.45%	0	0.00%	0.00%
2.5.9	1	1.03%	$21,536	0.02%	0	0.00%	0	0.00%	0	0.00%	0.00%
2.6.12	1	1.03%	$926,784	1.03%	0	0.00%	8	5.80%	0	0.00%	0.00%
2.6.16	1	1.03%	$152,675	0.17%	0	0.00%	0	0.00%	1	2.08%	100.00%
2.6.18	1	1.03%	$994,544	1.10%	0	0.00%	9	6.52%	0	0.00%	0.00%
2.6.6	1	1.03%	$29,853	0.03%	0	0.00%	0	0.00%	1	2.08%	100.00%
2.6.7	1	1.03%	$83,314	0.09%	0	0.00%	0	0.00%	0	0.00%	0.00%
2.6.8	1	1.03%	$1,848,663	2.05%	1	2.70%	3	2.17%	1	2.08%	100.00%
3.1.4	1	1.03%	$967,075	1.07%	0	0.00%	2	1.45%	0	0.00%	0.00%
3.1.6	1	1.03%	$102,907	0.11%	0	0.00%	0	0.00%	0	0.00%	0.00%
4.15	1	1.03%	$59,003	0.07%	0	0.00%	0	0.00%	1	2.08%	100.00%
4.16	1	1.03%	$512,176	0.57%	0	0.00%	2	1.45%	1	2.08%	100.00%
4.21	1	1.03%	$1,022,476	1.13%	0	0.00%	0	0.00%	0	0.00%	0.00%
4.23	1	1.03%	$1,259,389	1.39%	2	5.41%	0	0.00%	1	2.08%	100.00%
Totals	97	100.00%	$90,311,096	100.00%	37	100.00%	138	100.00%	48	100.00%	

APPENDIX F

ORIGINAL AVIATOR SURVEY

INTENTIONALLY LEFT BLANK

ORIGINAL AVIATOR SURVEY COVERSHEET

The following questions are intended to solicit your input regarding certain behaviors exhibited by Army aviation personnel. This information is being gathered as part of a study sponsored by the U.S. Army Safety Center.

Your responses will remain completely anonymous. The data will be used for assessment purposes only. This information will not become a part of your official record, nor will it be used to make any determination about you. You are not required to provide your name, social security number, or any other personal identifying data.

Please carefully complete both sections.

SECTION A. Demographic Data

SECTION B. Aviator Survey

[NOTE: There are four separate surveys with 10 identical queries, differing only by the statement at the top of each page. Please read the statement carefully before completing each survey.]

INTENTIONALLY LEFT BLANK

AVIATOR SURVEY

SECTION A. Demographic Data

1. Indicate the total number of years you have been an Army aviator.

_____
years

2. Indicate the approximate number of flight hours you have accrued in Army aircraft.

_____	_____	_____	_____
total	rotary wing	fixed wing	combat

3. Indicate your age.

_____
years

4. Indicate the aircraft in which you have accrued the most flight time during your Army aviation career.

_____
mission/type/design/series

5. Check all additional qualifications/ratings you hold or have held:

Pilot in Command	_____
Flight Lead	_____
Unit Trainer	_____
Instructor Pilot	_____
Standardization Instructor Pilot	_____
Instrument Flight Examiner	_____
Aviation Safety Officer	_____
Maintenance Test Pilot	_____
Maintenance Test Flight Examiner	_____

6. Have you ever been involved in an Army Class A-C aviation accident where you were identified by the accident board as having committed an error that contributed to the accident?

Yes [ ]

No [ ]

INTENTIONALLY LEFT BLANK

SECTION B1. SURVEY

Check the appropriate block that corresponds to the number of times (best guess) you have knowingly, and of your own volition, performed the following types of actions during your Army aviation career.

		Zero	Less than 3	3 to 5	More than 4 but less than 10	10 or more
1.	Flown terrain flight without fully/completely documenting on-board hazard maps	1	2	3	4	5
2.	Flown while in violation of unit crew endurance policy or fatigued to the extent that your performance was degraded	1	2	3	4	5
3.	Exceeded airspeed, power, or RPM limitations	1	2	3	4	5
4.	Performed unauthorized aerobatics, return to target maneuvers, or buzzed ground vehicles	1	2	3	4	5
5.	Flown without performing or improperly performed required performance planning tasks (power, fuel, weight and balance)	1	2	3	4	5
6.	Failed to correctly follow -10 emergency procedures for an actual engine, fuel control, or governor malfunction	1	2	3	4	5
7.	Exceeded fuel endurance limitations (-10 Operator's Manual)	1	2	3	4	5
8.	Flown into known illegal weather conditions (AR 95-1) or weather conditions you normally find unacceptable	1	2	3	4	5
9.	Intentionally operated so close to objects such as vegetation/terrain, other aircraft, or buildings and structures that strike avoidance was impossible	1	2	3	4	5
10.	Flown without completing aircraft preflight checks	1	2	3	4	5

SECTION B2. SURVEY

Check the appropriate block that corresponds to the number of times you have personally observed the following types of actions committed by another aviator during your Army aviation career.

		Zero	Less than 3	3 to 5	More than 5 but less than 10	10 or more
1.	Flown terrain flight without fully/completely documenting on-board hazard maps	1	2	3	4	4
2.	Flown while in violation of unit crew endurance policy or fatigued to the extent that your performance was degraded	1	2	3	4	5
3.	Exceeded airspeed, power, or RPM limitations	1	2	3	4	5
4.	Performed unauthorized aerobatics, return to target maneuvers, or buzzed ground vehicles	1	2	3	4	5
5.	Flown without performing or improperly performed required performance planning tasks (power, fuel, weight and balance)	1	2	3	4	5
6.	Failed to correctly follow -10 emergency procedures for an actual engine, fuel control, or governor malfunction	1	2	3	4	5
7.	Exceeded fuel endurance limitations (-10 Operator's Manual)	1	2	3	4	5
8.	Flown into known illegal weather conditions (AR 95-1) or weather conditions you normally find unacceptable	1	2	3	4	5
9.	Intentionally operated so close to objects such as vegetation/terrain, other aircraft, or buildings and structures that strike avoidance was impossible	1	2	3	4	5
10.	Flown without completing aircraft preflight checks	1	2	3	4	5

SECTION B3. SURVEY

Check the appropriate block that corresponds to the number of times someone has told you about seeing another aviator perform the following types of actions during your Army aviation career.

		Zero	Less than 3	3 to 5	More than 5 but less than 10	10 or more
1.	Flown terrain flight without fully/completely documenting on-board hazard maps	1	2	3	4	5
2.	Flown while in violation of unit crew endurance policy or fatigued to the extent that your performance was degraded	1	2	3	4	5
3.	Exceeded airspeed, power, or RPM limitations	1	2	3	4	5
4.	Performed unauthorized aerobatics, return to target maneuvers, or buzzed ground vehicles	1	2	3	4	5
5.	Flown without performing or improperly performed required performance planning tasks (power, fuel, weight and balance)	1	2	3	4	5
6.	Failed to correctly follow -10 emergency procedures for an actual engine, fuel control, or governor malfunction	1	2	3	4	5
7.	Exceeded fuel endurance limitations (-10 Operator's Manual)	1	2	3	4	5
8.	Flown into known illegal weather conditions (AR 95-1) or weather conditions you normally find unacceptable	1	2	3	4	5
9.	Intentionally operated so close to objects such as vegetation/terrain, other aircraft, or buildings and structures that strike avoidance was impossible	1	2	3	4	5
10.	Flown without completing aircraft preflight checks	1	2	3	4	5

SECTION B4. SURVEY

Check the block that corresponds to the <u>one</u> most appropriate administrative action you believe would discourage the types of behavior (first offense) listed below: [Note: additional training is not appropriate]

		Verbal counseling by the person witnessing the event	Verbal reprimand by the ASO, SIP, or commander, as appropriate	Revoke PC, UT, IP, etc., orders	Written reprimand by the commander (official file)	Disqualify from aviation service (Flight Evaluation Board)
1.	Flown terrain flight without fully/completely documenting hazard maps	1	2	3	4	5
2.	Flying while in violation of unit crew endurance policy or fatigued to the extent that your performance is degraded	1	2	3	4	5
3.	Exceeded airspeed, power, or RPM limitations	1	2	3	4	5
4.	Performing unauthorized aerobatics, return to target maneuvers, or buzzing ground vehicles	1	2	3	4	5
5.	Flying without performing or improperly performing required performance planning tasks (power, fuel, weight and balance)	1	2	3	4	5
6.	Failing to correctly follow procedures for an actual engine, fuel control, or governor malfunction	1	2	3	4	5
7.	Exceeding fuel endurance limitations (AR 95-1 or the -10 Operator's Manual)	1	2	3	4	5
8.	Flying into illegal weather conditions (AR 95-1) or weather conditions you normally find unacceptable	1	2	3	4	5
9.	Intentionally operating so close to objects such as vegetation/terrain, other aircraft, or buildings and structures that strike avoidance is impossible	1	2	3	4	5
10.	Flying without completing aircraft preflight checks	1	2	3	4	5

APPENDIX G

CANDIDATE RISK MANAGEMENT TECHNIQUE SURVEY

INTENTIONALLY LEFT BLANK

Candidate Risk Management Techniques

The following survey solicits your honest and objective opinions regarding two proposed techniques to reduce the frequency of occurrence of high risk behavior (see definition and list of behaviors at Appendix C) among Army aviators with minimal impact on unit administration and normal operating procedures. These techniques were developed as part of a study entitled "Indicators of Indiscipline, Phase II", conducted for the Army Safety Center by an independent contractor. After reviewing almost 500 aviation accident cases, the researchers found that high risk behavior was involved in over 20% of the accident cases with approximately half of those cases involving flagrant (e.g., blatant, disgraceful, shocking, or outrageously evident) violations of regulations or procedures.

Please review the attached materials and answer the following questions about the two proposed techniques:

(circle your response)

	Education Program		Enforcement Program		Both Programs	
a. Do you believe that these techniques could be implemented at unit level with minimal impact on unit administration and operating procedures?	Yes	No	Yes	No	Yes	No
b. Would you support these techniques in your unit?	Yes	No	Yes	No	Yes	No
c. Do you believe other ASO's would support these techniques in their units?	Yes	No	Yes	No	Yes	No

Please indicate any suggested changes you have to improve the techniques:

_____

_____

_____

_____

Other comments:

_____

_____

_____

_____

Voluntary Consent and Confidentiality Disclosure

Your participation in this survey is voluntary. Data is being collected and analyzed on a non-attribution basis. Your responses will not be identified with you personally or your unit in any way.

INTENTIONALLY LEFT BLANK

Candidate Risk Management Techniques

General

Two high risk management techniques are deemed appropriate for implementation in aviation units and are described in the following subparagraphs. One of these techniques emphasizes education and the other emphasizes enforcement. Both techniques require aviation unit commanders to survey unit aviators to identify their perception of the safety climate within the command. Because management of high risk behavior is a cooperative effort between leaders and unit aviators, it is important to understand the unit aviator's perception of the organization's safety climate. This perception strongly influences their behavior on the job and their desire to learn from and respond to these programs. The overall safety climate of a unit can have a significant effect, both positive and negative, on individual aviator behavior. The Safety Climate Assessment Form at appendix B was developed to analyze the organization's safety climate. It should be administered to all unit aviators who have been assigned to the unit for at least six months. The completed forms should be anonymously submitted to a unit point of contact, possibly the Aviation Safety Officer, who would keep the responses confidential and provide the commander a summary. The results, which should be shared with all participants, will show how unit aviators view the safety climate and where corrective actions should be concentrated. Follow-up surveys may be appropriate to determine if progress has been made and in which areas further work is required.

Education Program

The first technique involves educating commanders and unit aviators about high risk behavior (see definition and list of behaviors at appendix C). In order to use the administrative actions available to them, commanders must know precisely what constitutes HRB, each type of HRB's relative level of severity (based on costs, number of fatalities, injuries, and flagrant violations), and the appropriate corrective actions to reduce the likelihood of further occurrence. Because management of high risk behavior is both an individual (aviator) and leadership (commander) responsibility, unit aviators should also be included in this program. The matrix at appendix A portrays the various HRB's that have resulted in accidents, their severity ranking among HRB types, and suggested corrective actions. This matrix and the information

at appendices C and D should be used by commanders and safety officers to develop a short class to be given during unit level safety meetings.

Enforcement/Reinforcement Program

The second technique requires commanders to establish positive reinforcement techniques to encourage proper behavior. In modifying behavior, psychologists suggest that tighter control over people is not the only answer. Positive reinforcement is recommended as much more effective in changing human behavior than punishment and discipline. Positive reinforcement is the act of rewarding a person for their actions in order to encourage the recurrence of the behavior. One of the most effective rewards is recognition and personal praise from the commander. For example, if a pilot in command, air mission commander, or flight leader properly determines the weather or other environmental conditions to be less than that required for successful mission accomplishment and delays or cancels the mission, the commander should publicly commend the aviator for the decision. Likewise, when a unit aviator chooses not to fly because he is fatigued or ill and this condition is confirmed by the flight surgeon, the commander should openly praise the aviator's judgement. Even when an aviator makes a mistake, i.e., improper fuel planning, but decides to land short of destination and call for assistance, the commander should emphasize the correct decision to land short versus the planning error.

Of course, when the commander learns of an aviator who has displayed HRB, he should take swift and appropriate corrective action (appendix A) and ensure all other unit aviators are aware of the infraction and the consequences. The ultimate goal of this enforcement program is to encourage each unit aviator to make on the spot corrections so that everyone understands that high risk behavior is not condoned within the unit.

High Risk Behavior/Suggested Corrective Action Matrix

Severity Ranking	High Risk Behavior Description	Corrective Action First Offense	Corrective Action Second Offense
1	Performing unauthorized aerobatics, return to target maneuvers, or buzzing ground vehicles	Flagrant: Suspend PC, UT, IP, etc. orders for six months to one year Non-flagrant: NA	Flagrant: Suspend the aviator from flying duty and convene a Flying Evaluation Board (FEB) Non-flagrant: NA
2	Flying aircraft into illegal weather conditions or weather conditions normally considered unacceptable	Flagrant: Suspend PC, UT, IP, etc., orders for three to six months Non-flagrant: Verbal reprimand by the commander, additional training	Flagrant: Official letter of reprimand from commander, revoke PC, UT, IP, etc. , orders Non-flagrant: Formal counseling by the commander, suspend PC, UT, IP, etc., orders for six months
3	Intentionally operating aircraft so close to vegetation or terrain that strike avoidance is more a matter of luck than flying skill	Flagrant: Suspend PC, etc., orders for three to six months Non-flagrant: Verbal reprimand by the commander, additional training	Flagrant: Official letter of reprimand from commander, suspend PC, UT, IP, etc. orders for one year Non-flagrant: Formal counseling by the commander, suspend PC, UT, IP, etc. orders for three to six months
4	Flying aircraft without performing or improperly performing performance planning tasks (power, fuel, weight and balance)	Flagrant: Suspend PC, etc., orders for 30 days to three months Non-flagrant: Verbal counseling by peers/ unit leaders, additional training	Flagrant: Official letter of reprimand from commander, suspend PC, UT, IP, etc., orders for six months Non-flagrant: Verbal reprimand or formal counseling by the commander
5	Failing to correctly follow procedures for an actual engine, fuel control, or governor malfunction	Flagrant: Suspend PC, etc., orders for 30 days Non-flagrant: Verbal counseling by peers/ unit leaders, additional training	Flagrant: Official letter of reprimand from commander, suspend PC, UT, IP, etc., orders for three to six months Non-flagrant: Verbal reprimand or formal counseling by the commander

High Risk Behavior/Suggested Corrective Action Matrix

Severity Ranking	High Risk Behavior Description	Corrective Action First Offense	Corrective Action Second Offense
6	Exceeding airspeed, power, or RPM limitations	Flagrant: Suspend PC, etc., orders for 30 days Non-flagrant: Verbal counseling by peers/ unit leaders, additional training	Flagrant: Official letter of reprimand from commander, suspend PC, UT, IP, etc., orders for three to six months Non-flagrant: Verbal reprimand or formal counseling by the commander
7	Intentionally operating aircraft so close to another aircraft that strike avoidance is more a matter of luck than flying skill	Flagrant: Suspend PC, etc., orders for 30 days Non-flagrant: Verbal counseling by peers/ unit leaders, additional training	Flagrant: Official letter of reprimand from commander, suspend PC, UT, IP, etc., orders for three to six months Non-flagrant: Verbal reprimand or formal counseling by the commander
8	Intentionally operating aircraft so close to buildings or structures that strike avoidance is more a matter of luck than flying skill	Flagrant: Suspend PC, etc., orders for 30 days Non-flagrant: Verbal counseling by peers/unit leaders, additional training	Flagrant: Official letter of reprimand from commander, suspend PC, UT, IP, etc., orders for three to six months Non-flagrant: Verbal reprimand or formal counseling by the commander
9	Flying terrain flight without documenting or improperly documenting hazard maps	Flagrant: Verbal reprimand by the commander Non-flagrant: Verbal counseling by peers/ uint leaders	Flagrant: Formal Counseling by the commander, suspend PC, UT, IP, etc., orders for 30 days to three months Non-flagrant: Formal counseling by the commander
10	Flying aircraft without completing or improperly completing aircraft preflight or equipment checks	Flagrant: Verbal reprimand by the commander Non-flagrant: Verbal counseling by peers/ unit leaders	Flagrant: Formal counseling by the commander, suspend PC, UT, IP, etc., orders for 30 days to three months Non-flagrant: Formal counseling by the commander

High Risk Behavior/Suggested Corrective Action Matrix

Severity Ranking	High Risk Behavior Description	Corrective Action First Offense	Corrective Action Second Offense
11	Flying while in violation of unit crew endurance policy or fatigued to the extent that performance is degraded	Flagrant: Verbal reprimand by the commander Non-flagrant: Verbal counseling by peers/ unit leaders	Flagrant: Formal counseling by the commander, suspend PC, UT, IP, etc., orders for 30 days to three months Non-flagrant: Formal counseling by the commander
12	Operating in conditions conducive to loss of control (i.e., LTE)	Flagrant: Verbal reprimand by the commander Non-flagrant: Verbal counseling by peers/ unit leaders	Flagrant: Formal counseling by the commander, suspend PC, UT, IP, etc., orders for 30 days to three months Non-flagrant: Formal counseling by the commander
13	Exceeding fuel endurance limitations	Flagrant: Verbal reprimand by the commander Non-flagrant: Verbal counseling by peers/ unit leaders	Flagrant: Formal counseling by the commander, suspend PC, UT, IP, etc., orders for 30 days to three months Non-flagrant: Formal counseling by the commander
14	Flying aircraft without completing or improperly completing before takeoff or landing checks	Flagrant: Verbal reprimand by the commander Non-flagrant: Verbal counseling by peers/ unit leaders	Flagrant: Formal counseling by the commander, suspend PC, UT, IP, etc., orders for 30 days to three months Non-flagrant: Formal counseling by the commander
15	Failing to correctly follow procedures for specific flight profiles (i.e., NVG approach, landing/hovering in snow/dust, slope operations, or negotiating wire obstacles)	Flagrant: Verbal reprimand by the commander Non-flagrant: Verbal counseling by peers/ unit leaders	Flagrant: Formal counseling by the commander, suspend PC, UT, IP, etc., orders for 30 days to three months Non-flagrant: Formal counseling by the commander

High Risk Behavior/Suggested Corrective Action Matrix

Severity Ranking	High Risk Behavior Description	Corrective Action First Offense	Corrective Action Second Offense
16	Flying aircraft without completing or improperly completing mission briefing or crew briefing	Flagrant: Verbal reprimand by the commander Non-flagrant: Verbal counseling by peers/ unit leaders	Flagrant: Formal counseling by the commander, suspend PC, UT, IP, etc., orders for 30 days to three months Non-flagrant: Formal counseling by the commander

Notes:

(1) As a minimum, flagrant HRB causing an accident will result in a letter of reprimand from the commander.
(2) As a minimum, non-flagrant HRB causing an accident will result in a suspension of PC, UT, IP, etc., orders for 30 days.
(3) More than two instances of flagrant violations will result in a temporary suspension of PC, UT, IP, etc., orders for 30 days.
(4) More than two instances of non-flagrant violations will result in revocation of PC, UT, IP, etc., orders.
(5) Every flagrant violation will be brought to the commander's attention.

SAFETY CLIMATE ASSESSMENT FORM

General: This form should be completed by unit personnel who have been assigned for at least six months. There is no requirement to provide any personal identifying information (i.e., name, rank, social security number, job title, etc.)

Part I. - Aviation Safety Program Climate
Indicate your assessment of the aviation safety program environment by marking the percentage of the program that is:

	% of Total Program
• **Too Aggressive** (emphasized too much, overzealous, pushed too hard)	_____
• **Effective** (on target, worthwhile, beneficial)	_____
• **Vague** (borderline, questionable, imprecise)	_____
• **Negligent** (lax, careless, delinquent)	_____
• **Other** (you describe Part IV)	_____
Total	**100%**

Part II - Unit Safety Climate Factors
Rate your unit leaders on how well they do with regard to the factors listed below:

	RATING			
Climate Factors	Poor	Fair	Good	Excellent
Confidence and trust				
Subordinate well being				
Understanding of problems				
Training and assistance				
Providing support				
Disseminating information				
Seeking opinions				
Giving recognition				

Part III - Unit Safety Climate Requirements
Rate your organization on how well it satisfies the requirements listed below:

	RATING			
Climate Requirements	Poor	Fair	Good	Excellent
Commander's involvement				
Established performance criteria				
Awareness of performance criteria				
Training conducted to a standard				
Enforcement actions for safety violations				
Operations by the book				

Part IV - Suggestions for Improvement
Indicate how to improve the safety climate in the unit.

AVIATION HIGH RISK BEHAVIOR (HRB)

Personnel who operate aviation equipment or who manage or supervise aviation personnel and equipment exhibit high-risk behavior when they knowingly make errors of their own volition (indiscipline) that place aviation personnel or equipment at a level of risk that exceeds that necessary for mission accomplishment. Indiscipline includes inadequate composure, attention, and motivation as well as overconfidence, lack of confidence, and self imposed fatique and alcohol or drug abuse. High-risk behavior can be either flagrant or non-flagrant.

(Note: Some categories have been intentionally omitted.)

AVIATION HIGH RISK BEHAVIORS
(Pilots/Copilots/CrewMembers)

1. FLYING AIRCRAFT WITHOUT PERFORMING OR IMPROPERLY PERFORMING, REQUIRED FLIGHT PLANNING TASKS

1.1 Mission/crew briefing (designating crew duties/responsibilities)
1.2 Weather/NOTAM checks
1.3 Performance planning (power, fuel, weight/balance)
1.4 Documenting hazard maps (wires, obstructions)
1.5 Completing flight plans (route planning)
1.6 Completing aircraft preflight/equipment checks
1.7 Completing before takeoff/landing checks
1.8 Performing proper route/landing zone reconnaissance

2. PERFORMING UNSAFE ACTS IN FLIGHT

2.1 Unauthorized flight maneuvers/violating regulatory guidance
2.1.1 Aerobatics/"buzzing" ground vehicles/return-to-target maneuvers
2.1.3 Flying aircraft into unacceptable/illegal weather conditons
2.1.4. Allowing nonrated personnel to fly aircraft
2.1.5 Flying while fatigued or in violation of unit crew endurance policy
2.1.6 Violating local traffic separation criteria

2.2 Operating aircraft outside of accepted flight envelope/profile
2.2.2 Exceeding airspeed, power, or RPM limitations
2.2.3 Exceeding fuel endurance limitations
2.2.4 Exceeding other aircraft systems' limitations
2.2.5 Operating in conditions conducive to Loss of Tail Rotor Effectiveness (LTE)

2.3 Intentionally operating aircraft unnecessarily close to objects
2.3.1 Another aircraft
2.3.2 Buildings/structures
2.3.3 Vegetation/terrain
2.3.4 External load

2.5 **Failing to correctly follow procedures for emergency or near emergency situations**
2.5.1 Engine, fuel control, governor malfunctions
2.5.3 Flight control malfunctions
2.5.4 Other aircraft malfunctions
2.5.6 Loss of visual contact with the ground and/or obstacle
2.5.9 Landing gear malfunction

2.6 **Failing to correctly follow flight procedures for specific flight profiles**
2.6.1 Landing/hovering in snowdust
2.6.2 Slope operations
2.6.4 Night Vision Goggle approach
2.6.6 Confined area takeoff
2.6.7 Power approach/precision landing
2.6.8 In-flight join-up
2.6.12 Takeoff in snow/dust
2.6.14 Negotiate wire obstacles
2.6.16 High overhead approach
2.6.18 Steep turn

2.4 **Failing to ensure sufficient clearance from obstacles**
2.4.1 Crewmember was not searching/scanning
2.4.5 Crewmember searched, saw obstacle, but misjudged distance/closure rate/etc

3. **ALLOWING UNSAFE ACTS IN FLIGHT**

3.1 **Allowing copilot or other crewmembers to incorrectly perform duties**
3.1.4 Obstacle clearance responsibilities
3.1.6 Practice emergency maneuver

AVIATION HIGH RISK BEHAVIORS
(Supervisors/Leaders/Commanders)

4. **ALLOWING UNSAFE ACTS BEFORE FLIGHT**
4.15 Failing to establish or enforce crew endurance policies
4.16 Authorizing or participating in prohibited actions such as directing or allowing aviators to fly in unacceptable weather conditions
4.19 Assigning personnel to perform missions or tasks outside the capability of the aircraft or personnel (i.e., crew selection)
4.21 Failing to ensure hazard maps or other area hazards are properly documented.
4.23 Allowing personnel to perform without correction, actions prohibited by written, oral, or commonly accepted guidelines (i.e., altitude restrictions)

TOP 20 HIGH RISK BEHAVIORS - SPECIFIC CATEGORY

	HRB FREQ.		COST		FATALITIES		INJURIES		FLAGRANT			
HRB	NO.	%	$	%	NO.	%	NO.	%	NO.	%	% FLAG/FREQ	AVG %
2.1.1	11	11.34%	$10,947,638	12.12%	15	40.54%	15	10.87%	11	22.92%	100.00%	32.96%
2.1.3	6	6.19%	$8,960,873	9.92%	7	18.92%	12	8.70%	5	10.42%	83.33%	22.91%
2.3.3	3	3.09%	$1,868,516	2.07%	4	10.81%	0	0.00%	3	6.25%	100.00%	20.37%
1.3	3	3.09%	$695,670	0.77%	0	0.00%	5	3.62%	3	6.25%	100.00%	18.96%
2.5.1	2	2.06%	$2,330,432	2.58%	0	0.00%	2	1.45%	2	4.17%	100.00%	18.38%
2.2.2	6	6.19%	$4,998,207	5.53%	3	8.11%	18	13.04%	4	8.33%	66.67%	17.98%
2.3.1	2	2.06%	$89,535	0.10%	0	0.00%	0	0.00%	2	4.17%	100.00%	17.72%
4.19	4	4.12%	$716,662	0.79%	0	0.00%	1	0.72%	3	6.25%	75.00%	14.48%
2.3.2	3	3.09%	$824,250	0.91%	0	0.00%	9	6.52%	2	4.17%	66.67%	13.56%
1.4	2	2.06%	$4,924,330	5.45%	0	0.00%	6	4.35%	1	2.08%	50.00%	10.66%
1.6	3	3.09%	$11,388,340	12.61%	1	2.70%	1	0.72%	1	2.08%	33.33%	9.09%
2.1.5	3	3.09%	$4,604,072	5.10%	1	2.70%	6	4.35%	1	2.08%	33.33%	8.44%
2.2.5	3	3.09%	$438,842	0.49%	0	0.00%	5	3.62%	1	2.08%	33.33%	7.10%
2.2.3	3	3.09%	$216,592	0.24%	0	0.00%	0	0.00%	1	2.08%	33.33%	6.46%
1.7	4	4.12%	$9,383,161	10.39%	0	0.00%	8	5.80%	0	0.00%	0.00%	3.39%
2.6.4	3	3.09%	$6,472,137	7.17%	0	0.00%	10	7.25%	0	0.00%	0.00%	2.92%
2.6.1	4	4.12%	$1,577,859	1.75%	0	0.00%	5	3.62%	0	0.00%	0.00%	1.58%
2.6.2	4	4.12%	$2,024,022	2.24%	0	0.00%	4	2.90%	0	0.00%	0.00%	1.54%
2.6.14	2	2.06%	$2,499,090	2.77%	0	0.00%	1	0.72%	0	0.00%	0.00%	0.93%
1.1	2	2.06%	$166,041	0.18%	0	0.00%	0	0.00%	0	0.00%	0.00%	0.37%

REMAINING HIGH RISK BEHAVIORS - SPECIFIC CATEGORY (CONTINUED)											
	HRB FREQ.		COST		FATALITIES		INJURIES		FLAGRANT		
HRB	NO.	%	$	%	NO.	%	NO.	%	NO.	%	% FLAG/FREQ
1.2	1	1.03%	$630,221	0.70%	2	5.41%	0	0.00%	0	0.00%	0.00%
1.8	1	1.03%	$31,536	0.03%	0	0.00%	0	0.00%	0	0.00%	0.00%
.2.1.4	1	1.03%	$15,000	0.02%	0	0.00%	0	0.00%	1	2.08%	100.00%
2.1.6	1	1.03%	$12,714	0.01%	0	0.00%	0	0.00%	1	2.08%	100.00%
2.2.4	1	1.03%	$143,782	0.16%	0	0.00%	1	0.72%	0	0.00%	0.00%
2.3.4	1	1.03%	$24,179	0.03%	0	0.00%	0	0.00%	0	0.00%	0.00%
2.4.1	1	1.03%	$1,259,389	1.39%	1	2.70%	0	0.00%	0	0.00%	0.00%
2.4.5	1	1.03%	$26,268	0.03%	0	0.00%	0	0.00%	0	0.00%	0.00%
2.5.3	1	1.03%	$4,654,210	5.15%	0	0.00%	3	2.17%	0	0.00%	0.00%
2.5.4	1	1.03%	$57,751	0.06%	0	0.00%	0	0.00%	0	0.00%	0.00%
2.5.6	1	1.03%	$349,382	0.39%	0	0.00%	2	1.45%	0	0.00%	0.00%
2.5.9	1	1.03%	$21,536	0.02%	0	0.00%	0	0.00%	0	0.00%	0.00%
2.6.12	1	1.03%	$926,784	1.03%	0	0.00%	8	5.80%	0	0.00%	0.00%
2.6.16	1	1.03%	$152,675	0.17%	0	0.00%	0	0.00%	1	2.08%	100.00%
2.6.18	1	1.03%	$994,544	1.10%	0	0.00%	9	6.52%	0	0.00%	0.00%
2.6.6	1	1.03%	$29,853	0.03%	0	0.00%	0	0.00%	1	2.08%	100.00%
2.6.7	1	1.03%	$83,314	0.09%	0	0.00%	0	0.00%	0	0.00%	0.00%
2.6.8	1	1.03%	$1,848,663	2.05%	1	2.70%	3	2.17%	1	2.08%	100.00%
3.1.4	1	1.03%	$967,075	1.07%	0	0.00%	2	1.45%	0	0.00%	0.00%
3.1.6	1	1.03%	$102,907	0.11%	0	0.00%	0	0.00%	0	0.00%	0.00%
4.15	1	1.03%	$59,003	0.07%	0	0.00%	0	0.00%	1	2.08%	100.00%
4.16	1	1.03%	$512,176	0.57%	0	0.00%	2	1.45%	1	2.08%	100.00%
4.21	1	1.03%	$1,022,476	1.13%	0	0.00%	0	0.00%	0	0.00%	0.00%
4.23	1	1.03%	$1,259,389	1.39%	2	5.41%	0	0.00%	1	2.08%	100.00%
Totals	97	100.00%	$90,311,096	100.00%	37	100.00%	138	100.00%	48	100.00%	

APPENDIX H

RESULTS OF AVIATOR SURVEY PRETEST

INTENTIONALLY LEFT BLANK

SURVEY PRE-TEST RESULTS

DEMOGRAPHIC DATA								SURVEY DATA									Survey B1		
A/C Type	Age	Avn Svc	Total FT	RW FT	FW FT	CBT FT	Qualifications	Acc Error	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Avg
UH1H/V	39	8	1000	1000	0	0	PC,FL	N	5	4	5	5	3	5	5	5	5	5	4.7
UH1H	33	4	320	320	0	0	NONE	N	5	4	5	5	2	5	5	5	5	5	4.6
UH1H	33	7	1000	1000	0	0	PC,ASO	N	4	2	5	5	5	5	5	5	5	5	4.6
UH1H	41	8	1000	1000	0	0	PC,FL	N	4	3	5	5	4	5	5	5	5	5	4.6
UH1H	50	9	1600	1000	600	0	PC,FL,ASO	N	5	5	5	5	5	5	5	3	5	3	4.6
UH1H	40	11	1750	1600	150	0	PC,FL,MTP	N	4	4	5	5	4	5	5	4	5	5	4.6
UH1H	45	21	3000	2988	12	1048	PC,FL,IP,IFE,MTP	N	3	3	5	5	5	5	5	5	5	5	4.6
UH1H	42	22	4500	3000	1500	1500	PC,FL,UT,IP	N	4	4	4	5	5	5	5	5	4	5	4.6
UH1H	40	15	2000	2000	0	0	PC,FL	N	4	4	4	5	5	5	4	5	4	5	4.5
UH1H	47	20	6500	4500	2000	700	PC,IP,MTP	N	5	4	5	5	1	5	5	5	5	5	4.5
UH1H	29	4	1250	1200	50	0	PC,FL,MTP	N	3	4	4	5	4	5	5	4	5	5	4.4
UH1H	31	11	2800	2800	0	0	PC,FL,UT,IP,SIP,IFE,ASO	N	1	4	5	5	5	5	5	4	5	5	4.4
UH1H	34	14	2900	2900	0	0	PC,FL,UT,IP,ASO	N	3	4	5	2	5	5	5	5	5	5	4.4
OH58C	36	9	725	725	0	0	PC,FL	N	4	2	4	4	4	5	5	5	5	5	4.3
UH1H	31	12	4200	4000	200	0	PC,MTP,MTFE	N	5	2	5	5	2	5	4	5	5	5	4.3
UH1H	35	7	950	950	0	0	PC,ASO	N	3	2	5	5	2	5	5	5	5	5	4.2
OH58A	32	8	900	900	0	0	PC,FL	N	1	3	5	3	5	5	5	5	5	5	4.2
UH1H	38	14	1200	1150	50	0	PC,FL	Y	2	1	5	5	4	5	5	5	5	5	4.2
UH1H	45	16	3600	3500	100	1200	PC,FL,UT,IP	N	3	1	4	5	4	5	5	5	5	5	4.2
UH1H	43	18	3100	3100	0	0	PC,FL,UT	N	2	4	5	5	1	5	5	5	5	5	4.2
UH60A	37	7	1800	1800	0	0	PC,FL,MTP,MTFE	N	4	4	3	5	3	4	4	4	5	5	4.1
UH1H	44	15	2200	2200	0	900	PC,FL,UT,ASO	N	3	5	4	5	1	5	3	4	5	5	4
CH47D	45	22	6500	4500	2000	900	PC,FL,UT,IP,SIP,IFE,ASO, MTP	N	5	1	5	5	1	5	4	4	5	5	4
OH58A	30	6	2600	2600	0	0	PC,FL,IP,IFE	N	1	4	5	4	3	5	4	4	5	4	3.9
OH58A	43	18	3000	3000	0	500	PC,FL,IP	N	4	3	3	3	2	5	4	4	5	5	3.8
OH58A	43	22	7800	5100	2700	1200	PC,FL,UT,IP,SIP,ASO,MTP	N	1	4	4	4	3	5	4	4	5	4	3.8
UH1H/V	24	2	430	430	0	0	NONE	N	2	3	4	5	1	5	4	4	5	4	3.7
UH1H	32	7	1500	1500	0	0	PC,FL,UT,ASO	N	3	2	4	5	1	5	4	4	4	5	3.7
UH1H	47	23	1600	1600	0	850	PC,FL	N	3	3	3	5	3	5	3	3	5	3	3.6
UH1H	47	23	3000	3000	0	1000	PC,FL,MTP	N	2	2	4	4	1	5	4	3	5	5	3.5
UH1H	31	10	3950	3700	250	0	PC,FL,UT,IP,SIP,IFE	N	3	3	5	2	1	5	4	1	5	5	3.4
UH1H	42	22	7000	6000	1000	1200	PC,FL,IP,SIP,IFE,MTP	N	1	3	4	5	1	5	4	3	4	4	3.4
UH1H	44	14	4000	4000	0	850	PC,FL,UT,IP,IFE	N	1	2	2	3	2	5	4	4	5	4	3.2

SURVEY PRE-TEST RESULTS (Continued)

DEMOGRAPHIC DATA								SURVEY DATA									Survey B1		
A/C Type	Age	Avn Svc	Total FT	RW FT	FW FT	CBT FT	Qualifications	Acc Error	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Avg
CH47D	40	20	6000	5750	250	0	PC,FL,UT,IP,SIP,MTP	N	1	1	5	4	1	5	5	5	4	1	3.2
UH1H/V	33	8	1840	1840	0	0	PC,FL,UT,ASO	N	1	3	3	5	1	5	3	2	5	3	3.1
UH1H	44	18	1355	1355	0	0	PC,FL	N	1	1	5	1	1	5	5	2	4	5	3
UH60A	31	6	1900	1800	100	30	PC	N	1	1	2	2	1	4	5	3	4	5	2.8
UH1H	46	20	3100	3100	0	0	PC	N	1	1	1	1	1	5	3	4	5	5	2.7
UH1H	44	24	4900	4900	0	1200	PC,FL,IP,ASO,MTP	Y	1	1	1	1	1	5	1	1	5	4	2.1
							TOTAL		109	111	162	163	104	193	170	158	188	179	3.94
HIGH	50	24	7800	6000	2700	1500													
LOW	24	2	320	320	0	0													
MEAN	38.74	13.46	2789	2507.9	281.08	335.33													
MEDIAN	40	12																	

SURVEY PRE-TEST RESULTS

DEMOGRAPHIC DATA								SURVEY DATA									Survey B2		
A/C Type	Age	Avn Svc	Total FT	RW FT	FW FT	CBT FT	Qualifications	Acc Error	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Avg
UH1H	45	21	3000	2988	12	1048	PC,FL,IP,IFE,MTP	N	5	5	5	5	5	5	5	5	5	5	5
UH1H	41	8	1000	1000	0	0	PC,FL	N	5	3	5	4	5	5	5	5	5	5	4.7
OH58A	43	18	3000	3000	0	500	PC,FL,IP	N	4	4	4	4	5	5	5	4	5	5	4.5
UH1H	33	4	320	320	0	0	NONE	N	5	3	5	5	1	5	5	5	5	5	4.4
OH58A	32	8	900	900	0	0	PC,FL	N	1	4	5	5	5	5	4	5	5	5	4.4
UH1H	40	11	1750	1600	150	0	PC,FL,MTP	N	5	5	4	4	5	5	4	4	4	4	4.4
UH1H	42	22	4500	3000	1500	1500	PC,FL,UT,IP	N	4	4	5	4	4	5	5	5	4	4	4.4
UH1H/V	24	2	430	430	0	0	NONE	N	3	5	4	4	5	5	4	4	5	4	4.3
OH58C	36	9	725	725	0	0	PC,FL	N	4	3	5	4	4	5	4	5	5	4	4.3
UH1H	31	11	2800	2800	0	0	PC,FL,UT,IP,SIP,IFE,ASO	N	1	4	5	5	4	5	5	5	4	5	4.3
UH1H/V	39	8	1000	1000	0	0	PC,FL	N	4	5	4	5	2	5	5	3	5	4	4.2
UH1H	43	18	3100	3100	0	0	PC,FL,UT	N	3	4	5	3	4	5	4	5	4	5	4.2
UH1H	34	14	2900	2900	0	0	PC,FL,UT,IP,ASO	N	3	4	5	3	5	4	4	4	4	5	4.1
UH1H	40	15	2000	2000	0	0	PC,FL	N	3	4	4	4	4	4	4	4	4	5	4
UH1H	32	7	1500	1500	0	0	PC,FL,UT,ASO	N	4	3	5	5	2	5	2	3	5	5	3.9
UH1H	35	7	950	950	0	0	PC,ASO	N	1	1	5	4	4	5	3	5	5	5	3.8
UH1H	38	14	1200	1150	50	0	PC,FL	Y	1	1	5	4	4	5	4	4	5	4	3.7
UH1H	47	20	6500	4500	2000	700	PC,IP,MTP	N	5	2	3	4	1	5	4	3	5	5	3.7
UH1H	33	7	1000	1000	0	0	PC,ASO	N	1	1	3	4	4	5	4	5	5	4	3.6
UH1H	31	12	4200	4000	200	0	PC,MTP,MTFE	N	2	2	5	5	1	5	4	4	4	4	3.6
OH58A	43	22	7800	5100	2700	1200	PC,FL,UT,IP,SIP,ASO,MTP	N	2	4	4	4	4	4	4	2	4	4	3.6
UH1H	47	23	1600	1600	0	850	PC,FL	N	3	3	3	5	3	5	3	5	3	3	3.6
UH60A	37	7	1800	1800	0	0	PC,FL,MTP,MTFE	N	3	3	3	3	2	4	4	3	5	5	3.5
UH1H	45	16	3600	3500	100	1200	PC,FL,UT,IP	N	4	2	4	4	1	5	4	1	5	5	3.5
UH1H	29	4	1250	1200	50	0	PC,FL,MTP	N	3	3	3	5	1	5	4	4	5	1	3.4
UH1H	44	18	1355	1355	0	0	PC,FL	N	1	1	5	1	5	5	5	3	4	4	3.4
OH58A	30	6	2600	2600	0	0	PC,FL,IP,IFE	N	3	2	5	4	2	5	2	3	4	3	3.3
UH1H	44	15	2200	2200	0	900	PC,FL,UT,ASO	N	3	5	2	3	2	5	3	3	5	2	3.3
UH1H	50	9	1600	1000	600	0	PC,FL,ASO	N	3	1	3	3	3	4	4	2	4	3	3
CH47D	45	22	6500	4500	2000	900	PC,FL,UT,IP,SIP,IFE,ASO, MTP	N	4	1	5	4	1	1	4	1	4	4	2.9
UH1H	47	23	3000	3000	0	1000	PC,FL,MTP	N	2	2	3	1	1	5	4	3	4	3	2.8
UH1H/V	33	8	1840	1840	0	0	PC,FL,UT,ASO	N	1	1	4	2	1	5	5	1	5	1	2.6
UH1H	31	10	3950	3700	250	0	PC,FL,UT,IP ,SIP,IFE	N	1	2	3	2	1	4	4	1	4	4	2.6

SURVEY PRE-TEST RESULTS (Continued)

DEMOGRAPHIC DATA								SURVEY DATA									Survey B2		
A/C Type	Age	Avn Svc	Total FT	RW FT	FW FT	CBT FT	Qualifications	Acc Error	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Avg
UH1H	46	20	3100	3100	0	0	PC	N	1	3	1	1	1	5	3	3	5	3	2.6
UH1H	42	22	7000	6000	1000	1200	PC,FL,IP,SIP,IFE,MTP	N	1	1	4	4	1	4	3	1	4	3	2.6
UH1H	44	14	4000	4000	0	850	PC,FL,UT,IP,IFE	N	1	1	1	2	1	5	3	2	5	2	2.3
UH1H	44	24	4900	4900	0	1200	PC,FL,IP,ASO,MTP	Y	1	1	1	1	4	5	3	1	5	4	2.6
UH60A	31	6	1900	1800	100	30	PC	N	1	1	2	2	1	2	3	2	3	3	2
CH47D	40	20	6000	5750	250	0	PC,FL,UT,IP,SIP,MTP	N	1	1	5	3	1	1	3	1	1	1	1.8
							TOTAL		103	105	152	139	110	177	152	129	172	150	3.56
HIGH	50	24	7800	6000	2700	1500													
LOW	24	2	320	320	0	0													
MEAN	38.74	13.46	2789	2507.9	281.08	335.33													

SURVEY PRE-TEST RESULTS

DEMOGRAPHIC DATA									SURVEY DATA									Survey B3		
A/C Type	Age	Avn Svc	Total FT	RW FT	FW FT	CBT FT	Qualifications	Acc Error	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Avg
UH1H/V	24	2	430	430	0	0	NONE	N	5	4	5	5	5	5	5	5	5	5	4.9
UH1H	45	21	3000	2988	12	1048	PC,FL,IP,IFE,MTP	N	5	3	5	5	5	5	5	5	5	5	4.8
UH1H	41	8	1000	1000	0	0	PC,FL	N	5	3	5	4	5	5	4	5	5	5	4.6
UH1H/V	39	8	1000	1000	0	0	PC,FL	N	4	5	5	4	5	5	4	4	5	5	4.6
OH58C	36	9	725	725	0	0	PC,FL	N	4	4	4	5	4	5	5	5	5	5	4.6
UH1H	40	11	1750	1600	150	0	PC,FL,MTP	N	5	4	5	4	4	5	4	4	5	5	4.5
UH1H	35	7	950	950	0	0	PC,ASO	N	5	1	5	4	5	5	4	5	5	5	4.4
UH1H	31	12	4200	4000	200	0	PC,MTP,MTFE	N	5	5	4	4	4	4	4	4	5	5	4.4
UH1H	43	18	3100	3100	0	0	PC,FL,UT	N	4	3	5	4	5	5	4	5	4	5	4.4
UH1H	29	4	1250	1200	50	0	PC,FL,MTP	N	5	3	3	5	4	5	5	4	5	4	4.3
UH1H	34	14	2900	2900	0	0	PC,FL,UT,IP,ASO	N	5	3	4	4	5	5	4	4	5	4	4.3
UH1H	44	24	4900	4900	0	1200	PC,FL,IP,ASO,MTP	Y	4	4	4	4	4	5	4	4	5	5	4.3
UH1H	33	4	320	320	0	0	NONE	N	5	2	5	4	1	5	5	5	5	5	4.2
UH1H	42	22	4500	3000	1500	1500	PC,FL,UT,IP	N	5	4	4	4	4	5	4	4	4	4	4.2
UH1H	45	16	3600	3500	100	1200	PC,FL,UT,IP	N	4	5	5	3	1	5	5	2	5	5	5
UH1H	46	20	3100	3100	0	0	PC	N	4	5	3	3	4	4	4	4	4	5	4
OH58A	30	6	2600	2600	0	0	PC,FL,IP,IFE	N	4	4	5	4	3	5	3	3	5	3	3.9
OH58A	32	8	900	900	0	0	PC,FL	N	1	4	3	3	5	5	5	3	5	5	3.9
UH1H	47	23	1600	1600	0	850	PC,FL	N	5	5	4	4	4	5	3	3	3	3	3.9
UH1H	32	7	1500	1500	0	0	PC,FL ,UT,ASO	N	5	2	4	4	2	5	3	3	5	5	3.8
UH1H	40	15	2000	2000	0	0	PC,FL	N	3	4	4	3	4	4	4	4	4	4	3.8
UH1H	44	18	1355	1355	0	0	PC,FL	N	4	3	5	4	5	5	3	2	3	4	3.8
UH1H	31	11	2800	2800	0	0	PC,FL,UT,IP,SIP,IFE,ASO	N	1	4	4	4	4	4	5	3	4	4	3.7
UH1H	33	7	1000	1000	0	0	PC,ASO	N	4	1	4	4	3	5	4	3	5	1	3.4
OH58A	43	18	3000	3000	0	500	PC,FL,IP	N	3	3	3	3	4	4	3	3	4	4	3.4
OH58A	43	22	7800	5100	2700	1200	PC,FL,UT,IP,SIP,ASO,MTP	N	5	4	3	1	4	4	4	1	4	4	3.4
UH60A	37	7	1800	1800	0	0	PC,FL,MTP,MTFE	N	3	2	3	3	3	4	4	1	5	4	3.2
UH1H	47	20	6500	4500	2000	700	PC,IP,MTP	N	5	1	2	2	1	4	4	3	4	4	3
UH1H	44	14	4000	4000	0	850	PC,FL,UT,IP,IFE	N	4	1	4	3	3	4	2	2	3	3	2.9
UH1H	38	14	1200	1150	50	0	PC,FL	Y	1	1	3	2	4	2	3	3	4	4	2.7
UH1H	42	22	7000	6000	1000	1200	PC,FL,IP,SIP,IFE,MTP	N	2	1	3	3	1	4	1	2	4	3	2.4
UH1H/V	33	8	1840	1840	0	0	PC,FL,UT,ASO	N	3	3	3	1	1	5	2	1	3	1	2.3
CH47D	45	22	6500	4500	2000	900	PC,FL,UT,IP,SIP,IFE,ASO, MTP	N	4	3	2	2	1	1	4	1	4	1	2.3

SURVEY PRE-TEST RESULTS (Continued)

DEMOGRAPHIC DATA								SURVEY DATA									Survey B3		
A/C Type	Age	Avn Svc	Total FT	RW FT	FW FT	CBT FT	Qualifications	Acc Error	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Avg
UH1H	31	10	3950	3700	250	0	PC,FL,UT,IP,SIP,IFE	N	3	1	2	2	2	3	1	1	3	4	2.2
UH1H	44	15	2200	2200	0	900	PC,FL,UT,ASO	N	2	2	1	2	1	5	1	2	5	1	2.2
UH1H	47	23	3000	3000	0	1000	PC,FL,MTP	N	1	1	2	1	1	4	3	1	3	1	1.8
UH60A	31	6	1900	1800	100	30	PC	N1	1	1	1	1	1	2	1	1	2	2	1.3
CH47D	40	20	6000	5750	250	0	PC,FL,UT,IP,SIP,MTP	N	1	1	1	1	1	2	2	1	2	1	1.3
UH1H	50	9	1600	1000	600	0	PC,FL,ASO	N	1	1	1	1	1	1	1	1	1	1	1
							TOTAL		140	111	138	124	124	165	136	117	162	144	3.51
HIGH	50	24	7800	6000	2700	1500													
LOW	24	2	320	320	0	0													
MEAN	38.74	13.46	2789	2507.9	281.08	335.33													

SURVEY PRE-TEST RESULTS

DEMOGRAPHIC DATA								SURVEY DATA									Survey B4		
A/C Type	Age	Avn Svc	Total FT	RW FT	FW FT	CBT FT	Qualifications	Acc Error	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Avg
OH58A	32	8	900	900	0	0	PC,FL	N	3	3	3	4	4	3	4	4	4	4	3.6
CH47D	40	20	6000	5750	250	0	PC,FL,UT,IP,SIP,MTP	N	2	3	5	5	2	3	3	5	5	3	3.6
OH58A	43	18	3000	3000	0	500	PC,FL,IP	N	3	2	3	4	3	3	4	5	5	3	3.5
UH1H	43	18	3100	3100	0	0	PC,FL,UT	N	3	4	3	3	4	3	3	3	5	3	3.4
UH1H	38	14	1200	1150	50	0	PC,FL	Y	2	2	4	5	2	3	4	3	5	3	3.3
OH58C	36	9	725	725	0	0	PC,FL	N	3	2	2	4	3	3	4	4	4	3	3.2
UH1H/V	24	2	430	430	0	0	NONE	N	3	2	3	5	3	5	2	2	5	1	3.1
UH1H	34	14	2900	2900	0	0	PC,FL,UT,IP,ASO	N	2	2	4	2	1	3	4	3	5	3	2.9
CH47D	45	22	6500	4500	2000	900	PC,FL,UT,IP,SIP,IFE,ASO, MTP	N	3	2	3	4	2	3	3	3	3	3	2.9
UH1H	35	7	950	950	0	0	PC,ASO	N	1	2	3	4	1	3	4	4	5	1	2.8
UH1H	33	7	1000	1000	0	0	PC,ASO	N	2	2	3	3	2	3	3	3	5	2	2.8
UH1H/V	39	8	1000	1000	0	0	PC,FL	N	2	2	3	3	2	3	2	3	5	3	2.8
UH1H	31	11	2800	2800	0	0	PC,FL,UT,IP,SIP,IFE,ASO	N	2	3	2	3	3	3	5	3	1	3	2.8
UH1H	33	4	320	320	0	0	NONE	N	2	2	3	3	1	4	3	3	4	2	2.7
UH1H	42	22	7000	6000	1000	1200	PC,FL,IP,SIP,IKFE,MTP	N	2	2	2	3	2	3	3	3	4	3	2.7
UH1H	50	9	1600	1000	600	0	PC,FL,ASO	N	2	2	3	4	1	2	4	2	4	2	2.6
UH1H	42	22	4500	3000	1500	1500	PC,FL,UT,IP	N	1	2	3	4	3	1	4	4	3	1	2.6
UH60A	37	7	1800	1800	0	0	PC,FL,MTP,MTFE	N	2	2	3	4	2	2	2	2	3	3	2.5
UH1H	44	14	4000	4000	0	850	PC,FL,UT,IP,IFE	N	2	2	2	3	2	2	3	3	4	2	2.5
UH1H	46	20	3100	3100	0	0	PC	N	2	2	2	2	2	3	3	2	3	4	2.5
UH1H	45	21	3000	2988	12	1048	PC,FL,IP,IFE,MTP	N	2	2	3	3	2	2	3	2	3	3	2.5
UH1H	40	15	2000	2000	0	0	PC,FL	N	2	2	1	3	2	3	2	3	3	3	2.4
OH58A	43	22	7800	5100	2700	1200	PC,FL,UT,IP,SIP,ASO,MTP	N	2	2	1	3	1	2	3	3	4	3	2.4
UH1H	45	16	3600	3500	100	1200	PC,FL,UT,IP	N	1	2	3	3	1	2	3	2	3	3	2.3
UH1H	44	18	1355	1355	0	0	PC,FL	N	2	1	3	3	2	3	3	3	2	1	2.3
UH1H	44	24	4900	4900	0	1200	PC,FL,IP,ASO,MTP	Y	2	2	2	3	2	3	2	2	3	2	2.3
UH1H/V	33	8	1840	1840	0	0	PC,FL,UT,ASO	N	2	1	2	5	2	1	2	2	3	2	2.2
UH1H	40	11	1750	1600	150	0	PC,FL,MTP	N	2	3	1	3	1	2	3	1	3	3	2.2
UH1H	47	20	6500	4500	2000	700	PC,IP,MTP	N	2	1	1	3	2	1	4	2	3	3	2.2
UH1H	47	23	3000	3000	0	1000	PC,FL,MTP	N	1	1	2	3	3	1	2	3	3	3	2.2
UH1H	29	4	1250	1200	50	0	PC,FL,MTP	N	1	1	1	4	2	1	3	2	4	2	2.1
OH58A	30	6	2600	2600	0	0	PC,FL,IP,IFE	N	1	2	3	2	1	3	1	2	3	2	2
UH60A	31	6	1900	1800	100	30	PC	N	1	1	2	2	2	1	3	2	3	3	2

SURVEY PRE-TEST RESULTS (Continued)

DEMOGRAPHIC DATA								SURVEY DATA									Survey B4		
A/C Type	Age	Avn Svc	Total FT	RW FT	FW FT	CBT FT	Qualifications	Acc Error	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Avg
UH1H	31	10	3950	3700	250	0	PC,FL,UT,IP,SIP,IFE	N	1	1	2	3	1	2	3	2	3	2	2
UH1H	32	7	1500	1500	0	0	PC,FL,UT,ASO	N	1	1	2	5	1	3	1	1	1	2	1.8
UH1H	31	12	4200	4000	200	0	PC,MTP,MTFE	N	1	2	3	3	1	1	1	2	2	2	1.8
UH1H	47	23	1600	1600	0	850	PC,FL	N	1	2	1	4	1	2	1	2	3	1	1.8
UH1H	44	15	2200	2200	0	900	PC,FL,UT,ASO	N	1	2	1	4	1	3	1	1	2	1	1.7
UH1H	41	8	1000	1000	0	0	PC,FL	N	1	1	1	2	1	1	2	1	1	1	1.2
							TOTAL		71	75	94	133	74	95	110	102	134	94	2.52
HIGH	50	24	7800	6000	2700	1500													
LOW	24	2	320	320	0	0													
MEAN	38.74	13.46	2789	2507.9	281.08	335.33													

APPENDIX I

REFINED AVIATOR SURVEY

INTENTIONALLY LEFT BLANK

REFINED AVIATOR SURVEY COVERSHEET

The following questions are intended to solicit your input regarding certain behaviors exhibited by Army aviation personnel. This information is being gathered as part of a study sponsored by the U.S. Army Safety Center.

Your responses will remain completely anonymous. The data will be used for assessment purposes only. This information will not become a part of your official record, nor will it be used to make any determination about you. You are not required to provide your name, social security number, or any other personal identifying data.

Please carefully complete both sections.

SECTION A. Demographic Data

SECTION B. Aviator Survey

[NOTE: There are six separate surveys with 10 identical queries, differing only by the statement at the top of each page. Please read the statement carefully before completing each survey.]

INTENTIONALLY LEFT BLANK

AVIATOR SURVEY

SECTION A. Demographic Data

1. Indicate the total number of years you have been an Army aviator.

_____
years

2. Indicate the approximate number of flight hours you have accrued in Army aircraft.

_____	_____	_____	_____
total	rotary wing	fixed wing	combat

3. Indicate your age.

_____
years

4. Indicate the aircraft in which you have accrued the most flight time during your Army aviation career.

_____
mission/type/design/series

5. Check all additional qualifications/ratings you hold or have held:

Pilot in Command	_____
Flight Lead	_____
Unit Trainer	_____
Instructor Pilot	_____
Standardization Instructor Pilot	_____
Instrument Flight Examiner	_____
Aviation Safety Officer	_____
Maintenance Test Pilot	_____
Maintenance Test Flight Examiner	_____

6. Have you ever been involved in an Army Class A-C aviation accident where you were identified by the accident board as having committed an error that contributed to the accident?

Yes [ ]

No [ ]

INTENTIONALLY LEFT BLANK

SECTION B1. SURVEY

Check the appropriate block that corresponds to the number of times (best guess) you have knowingly, and of your own volition, performed the following types of actions during your Army aviation career.

		Zero	Less than 3	3 to 5	More than 4 but less than 10	10 or more
1.	Flown terrain flight without fully/completely documenting on-board hazard maps	1	2	3	4	5
2.	Flown while in violation of unit crew endurance policy or fatigued to the extent that your performance was degraded	1	2	3	4	5
3.	Exceeded airspeed, power, or RPM limitations	1	2	3	4	5
4.	Performed unauthorized aerobatics, return to target maneuvers, or buzzed ground vehicles	1	2	3	4	5
5.	Flown without performing or improperly performed required performance planning tasks (power, fuel, weight and balance)	1	2	3	4	5
6.	Failed to correctly follow -10 emergency procedures for an actual engine, fuel control, or governor malfunction	1	2	3	4	5
7.	Exceeded fuel endurance limitations (-10 Operator's Manual)	1	2	3	4	5
8.	Flown into known illegal weather conditions (AR 95-1) or weather conditions you normally find unacceptable	1	2	3	4	5
9.	Intentionally operated so close to objects such as vegetation/terrain, other aircraft, or buildings and structures that strike avoidance was impossible	1	2	3	4	5
10.	Flown without completing aircraft preflight checks	1	2	3	4	5

AVIATOR SURVEY

SECTION B2. SURVEY

Check the appropriate block that corresponds to the number of times you have felt command pressure or have otherwise been coerced into performing the following types of actions during your Army aviation career.

		Zero	Less than 3	3 to 5	More than 4 but less than 10	10 or more
1.	Flown terrain flight without fully/completely documenting on-board hazard maps	1	2	3	4	5
2.	Flown while in violation of unit crew endurance policy or fatigued to the extent that your performance was degraded	1	2	3	4	5
3.	Exceeded airspeed, power, or RPM limitations	1	2	3	4	5
4.	Performed unauthorized aerobatics, return to target maneuvers, or buzzed ground vehicles	1	2	3	4	5
5.	Flown without performing or improperly performed required performance planning tasks (power, fuel, weight and balance)	1	2	3	4	5
6.	Failed to correctly follow -10 emergency procedures for an actual engine, fuel control, or governor malfunction	1	2	3	4	5
7.	Exceeded fuel endurance limitations (-10 Operator's Manual)	1	2	3	4	5
8.	Flown into known illegal weather conditions (AR 95-1) or weather conditions you normally find unacceptable	1	2	3	4	5
9.	Intentionally operated so close to objects such as vegetation/terrain, other aircraft, or buildings and structures that strike avoidance was impossible	1	2	3	4	5
10.	Flown without completing aircraft preflight checks	1	2	3	4	5

SECTION B3. SURVEY

Check the appropriate block that corresponds to the number of times you have personally observed the following types of actions committed by another aviator during your Army aviation career.

		Zero	Less than 3	3 to 5	More than 5 but less than 10	10 or more
1.	Flown terrain flight without fully/completely documenting on-board hazard maps	1	2	3	4	4
2.	Flown while in violation of unit crew endurance policy or fatigued to the extent that your performance was degraded	1	2	3	4	5
3.	Exceeded airspeed, power, or RPM limitations	1	2	3	4	5
4.	Performed unauthorized aerobatics, return to target maneuvers, or buzzed ground vehicles	1	2	3	4	5
5.	Flown without performing or improperly performed required performance planning tasks (power, fuel, weight and balance)	1	2	3	4	5
6.	Failed to correctly follow -10 emergency procedures for an actual engine, fuel control, or governor malfunction	1	2	3	4	5
7.	Exceeded fuel endurance limitations (-10 Operator's Manual)	1	2	3	4	5
8.	Flown into known illegal weather conditions (AR 95-1) or weather conditions you normally find unacceptable	1	2	3	4	5
9.	Intentionally operated so close to objects such as vegetation/terrain, other aircraft, or buildings and structures that strike avoidance was impossible	1	2	3	4	5
10.	Flown without completing aircraft preflight checks	1	2	3	4	5

SECTION B4. SURVEY

Check the appropriate block that corresponds to the number of times someone has told you about seeing another aviator perform the following types of actions during your Army aviation career.

		Zero	Less than 3	3 to 5	More than 5 but less than 10	10 or more
1.	Flown terrain flight without fully/completely documenting on-board hazard maps	1	2	3	4	5
2.	Flown while in violation of unit crew endurance policy or fatigued to the extent that your performance was degraded	1	2	3	4	5
3.	Exceeded airspeed, power, or RPM limitations	1	2	3	4	5
4.	Performed unauthorized aerobatics, return to target maneuvers, or buzzed ground vehicles	1	2	3	4	5
5.	Flown without performing or improperly performed required performance planning tasks (power, fuel, weight and balance)	1	2	3	4	5
6.	Failed to correctly follow -10 emergency procedures for an actual engine, fuel control, or governor malfunction	1	2	3	4	5
7.	Exceeded fuel endurance limitations (-10 Operator's Manual)	1	2	3	4	5
8.	Flown into known illegal weather conditions (AR 95-1) or weather conditions you normally find unacceptable	1	2	3	4	5
9.	Intentionally operated so close to objects such as vegetation/terrain, other aircraft, or buildings and structures that strike avoidance was impossible	1	2	3	4	5
10.	Flown without completing aircraft preflight checks	1	2	3	4	5

SECTION B5. SURVEY

Check the block that corresponds to the <u>one</u> most appropriate administrative action you believe would discourage the types of behavior (first offense) listed below: [Note: additional training is not appropriate]

		Verbal counseling by the person witnessing the event	Verbal reprimand by the ASO, SIP, or commander, as appropriate	Revoke PC, UT, IP, etc., orders	Written reprimand by the commander (official file)	Disqualify from aviation service (Flight Evaluation Board)
1.	Flown terrain flight without fully/completely documenting hazard maps	1	2	3	4	5
2.	Flying while in violation of unit crew endurance policy or fatigued to the extent that your performance is degraded	1	2	3	4	5
3.	Exceeded airspeed, power, or RPM limitations	1	2	3	4	5
4.	Performing unauthorized aerobatics, return to target maneuvers, or buzzing ground vehicles	1	2	3	4	5
5.	Flying without performing or improperly performing required performance planning tasks (power, fuel, weight and balance)	1	2	3	4	5
6.	Failing to correctly follow procedures for an actual engine, fuel control, or governor malfunction	1	2	3	4	5
7.	Exceeding fuel endurance limitations (AR 95-1 or the -10 Operator's Manual)	1	2	3	4	5
8.	Flying into illegal weather conditions (AR 95-1) or weather conditions you normally find unacceptable	1	2	3	4	5
9.	Intentionally operating so close to objects such as vegetation/terrain, other aircraft, or buildings and structures that strike avoidance is impossible	1	2	3	4	5
10.	Flying without completing aircraft preflight checks	1	2	3	4	5

SECTION B6. SURVEY

Check the block that corresponds to the one most appropriate administrative action you believe would discourage the types of behavior (second or more offenses) listed below: [Note: additional training is not appropriate]

		Verbal counseling by the person witnessing the event	Verbal reprimand by the ASO, SIP, or commander, as appropriate	Revoke PC, UT, IP, etc., orders	Written reprimand by the commander (official file)	Disqualify from aviation service (Flight Evaluation Board)
1.	Flown terrain flight without fully/completely documenting hazard maps	1	2	3	4	5
2.	Flying while in violation of unit crew endurance policy or fatigued to the extent that your performance is degraded	1	2	3	4	5
3.	Exceeded airspeed, power, or RPM limitations	1	2	3	4	5
4.	Performing unauthorized aerobatics, return to target maneuvers, or buzzing ground vehicles	1	2	3	4	5
5.	Flying without performing or improperly performing required performance planning tasks (power, fuel, weight and balance)	1	2	3	4	5
6.	Failing to correctly follow procedures for an actual engine, fuel control, or governor malfunction	1	2	3	4	5
7.	Exceeding fuel endurance limitations (AR 95-1 or the -10 Operator's Manual)	1	2	3	4	5
8.	Flying into illegal weather conditions (AR 95-1) or weather conditions you normally find unacceptable	1	2	3	4	5
9.	Intentionally operating so close to objects such as vegetation/terrain, other aircraft, or buildings and structures that strike avoidance is impossible	1	2	3	4	5
10.	Flying without completing aircraft preflight checks	1	2	3	4	5

APPENDIX J

REFERENCES

INTENTIONALLY LEFT BLANK

REFERENCES

Runcie, Dennis (1991), Inadequate Self-Discipline as a Causal Factor in Human Error Accidents

Beall, J.A., Jr. (1972), A Strategy for the Reduction of Private Motor Vehicle Accidents in a Military Unit.

Runcie, Dennis (1991), Personal Accountability Survey

Gregory, Earl D. (1991), Motivational Management Techniques for Safety and Health, Professional Safety, January 1991, pp. 29-33.

Geiss, C. and Alvardo, M. (1989), Aircrew Coordination Training Handbook

AR 600-105, Aviation Service of Rated Army Officers, chapters 3, 4, December 1983.

INTENTIONALLY LEFT BLANK

APPENDIX K

GLOSSARY

INTENTIONALLY LEFT BLANK

GLOSSARY

ACFT	Aircraft
ACT	Aircrew Coordination Training
ADAPCP	Alcohol and Drug Abuse Prevention and Control Program
AFAST	Alternate Flight Aptitude Selection Test
AFQT	Armed Forces Qualification Test
AIDS	Accident/Incident Data System
AIRAC	All Industry Research Advisory Council
AR	Army Regulation
ARI	Army Research Institute
ASMIS	Army Safety Management Information System
ASO	Aviation Safety Officer
ASVAB	Armed Services Vocational Aptitude Battery
ATM	Aircrew Training Manual
CD-ROM	Compact Disk-Read Only Memory
CM	Crewmember
CP	Copilot
CRC	Crime Records Center
CODARS	Client Oriented Drug and Alcohol Reporting System
CVB	Central Violations Bureau
DA	Department of the Army
DAMIS	Drug and Alcohol Management Information System
DOD	Department of Defense
DMDC	Defense Manpower Data Center
DUI	Driving Under the Influence
EIS	Enforcement Information System
ETS	Expiration, Term of Service
FAA	Federal Aviation Administration
FAST	Flight Aptitude Selection Test
FBI	Federal Bureau of Investigation
FEB	Flying Evaluation Board
HRB	High Risk Behavior
IERW	Initial Entry Rotary Wing
IP	Instructor Pilot
IQ	Intelligence Quotient
LTE	Loss of Tail Rotor Effectiveness
MOS	Military Occupational Specialty
NCIC	National Crime Information Center
NDR	National Driver Register
NHTSA	National Highway Traffic Safety Administration
NTSB	National Transportation Safety Board
PCC	Pre-Command Course
PDS	Pilot Deviation System
PRAM	Preliminary Report of Aircraft Mishap
PROC CORR	Correlation Procedure
PROC FREQ	Frequency Procedure
RFAST	Revised Flight Aptitude Selection Test

RPM	Revolutions Per Minute
SAS	Statistical Analysis System
SM	Servicemember
SSAN	Social Security Account Number
U.S.	United States
USACIDC	U.S. Army Criminal Investigation Command
USADAOA	U.S. Army Drug and Alcohol Operations Agency
USASC	U.S. Army Safety Center
UT	Unit Trainer

INTENTIONALLY LEFT BLANK